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Manual

FOR

Borough and Township

HIGH SCHOOLS

IN

Pennsylvania

ISSUED BY
THE DEPARTMENT OF PUBLIC INSTRUCTION
SECOND EDITION (REVISED)

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
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INTRODUCTION.

The continuous demand for copies of the first edition of the High School Manual issued in 1909 has long since entirely exhausted the supply. In the revised edition the aim has been to assemble and arrange the work in accordance with the ideas gained by experience and in keeping with approved practice in many good high schools. In collecting the material free use has been made of the National Education Committee reports, text books and general literature bearing on secondary education.

The minimum requirements for admission to high schools do not constitute a course of study for elementary schools. They are intended to aid the teachers in the selection of the essentials of instruction, and to unify the work of the grades and the work of the high school.

The outlines of high school studies are designed to aid teachers and directors in their efforts to make the high schools efficient. These outlines have been planned on the assumption that the school year consists of at least nine months. Teachers and pupils are not expected to accomplish in seven or eight months, what is here outlined for a school year.

City high schools can of course attempt more than is here outlined, and each community can make additions suited to its special needs and industries.

LEGISLATION AND APPROPRIATIONS.

The last legislature appropriated one hundred thousand dollars to aid in the payment of the high school tuition of non-resident pupils, and four hundred fifty thousand dollars to support and encourage

township and borough high schools. High schools in independent districts as well as joint high schools will hereafter receive a share of the appropriation in aid of township and borough high schools.

Under the last General Appropriation Act no district can participate in this appropriation if its high school has an attendance of fewer than twelve pupils. Pupils who have not completed the studies of the grammar school (usually known as the seventh and eighth grades) can not be counted as high school pupils.

Pupils residing in a district which maintains no high school, can attend the nearest or most convenient high school at the expense of their district, and in order to lessen the burden of this expense and to strengthen the high schools already established, the legislature set apart the sum of one hundred thousand dollars to aid in paying the tuition of non-resident pupils. Judge Bouton recently gave an opinion that non-resident pupils applying for admission to a high school must be examined by the principal of that high school under the direction of the County Superintendent, and admitted by the vote of the Board of Directors in charge of said high school, their action being duly recorded on the minutes, otherwise the district in which the pupil resides, is not liable for payment of tuition.

No high school can hereafter receive appropriation as a high school of the first grade unless it has at least three teachers who devote their entire time to high school work during a period of nine months, and no high school can receive appropriation as a high school of the second grade unless it has two teachers who devote their entire time to high school work during a period of eight months.

Section 1704 of the School Code says, "Except in school districts of the first class, the board of school directors of every school district which shares in the special appropriation for high schools shall employ for its high school during the entire term, a sufficient number of teachers for the teaching of any of the following branches; namely: bookkeeping, civil government, general history, algebra, geometry, rhetoric, English literature, Latin (including Caesar, Virgil, and Cicero), physical geography, and the elements of botany, of zoology, of physics, and of chemistry. But no teacher shall be employed to teach any branch other than those enumerated in his certificate."

The possession of a normal school or college certificate does not prove that the holder has the qualifications specified in the School Code. The County Superintendent can issue a provisional certificate for branches not named on the normal or college certificate, but this should be done only on the basis of an examination and should not degenerate into a mere device to obey the letter of the law while violating its spirit and manifest intention.

The classification of high schools is based upon the work actually accomplished and not upon the printed course of study. In cases

of doubt the high school inspector may visit a high school several times to ascertain the facts. It is the law in some states and the custom in all to classify high schools on the basis of the shortest course from which they graduate pupils. This is necessary to comply with the requirements of Entrance Examination Boards which give credit for work indicated by high school certificates or diplomas.

There are about forty learned vocations which aspire to the rank of professions and require a four year high school training as a part of the required preliminary education for the special courses leading to these vocations. Whilst for a large proportion of the pupils the high school is a finishing school, it should so far as possible aim also to be a fitting school for those who wish to enter a professional school, or a technical school, or a college.

On the other hand the high school should not aim to do the work which properly belongs to the normal school. The last legislature appropriated a total of $797,000 to pay at normal schools and city training schools the tuition of persons preparing to teach, and it should not be expected that township and borough high schools duplicate the work of these professional schools.

Reviews of the common branches designed to prepare for teachers' examinations or for advanced classes in the normal school, should not be considered the legitimate function of township and borough schools, because such reviews interfere with the instruction needed by that great majority of pupils for whom the high school must be the finishing school.

The use of tobacco and especially of the cigarette by high school pupils should be emphatically discouraged. High school principals are unanimous in declaring that the use of tobacco has a more or less harmful effect on the work of pupils if not upon their physical development. There is unanimity of opinion to the effect that the boy who smokes is not as alert in the pursuit of his studies as the boy who abstains. Tobacco injures the memory, takes the edge off the reasoning powers, and weakens perception if used by immature individuals.

MINIMUM REQUIREMENTS FOR ADMISSION TO HIGH SCHOOL.

The paragraphs below indicate the nature and scope of the work to be done in English:

LITERATURE, GRAMMAR AND SPELLING.

I. Pupils should have well defined notions about each of the following: Language, inflection, conjugation, declension, comparison, gender, person, case, number and voice.

II. Knowledge of the pronouns and ability to use them.

III. Knowledge of the sentence:—(1) Subject, (2) predicate, (3) classification according to use, (4) according to form, (5) ability to recognize and write each correctly.

IV. Clauses:—Ability to discriminate between independent and dependent clauses. Drill in analysis of easy sentences.

V. Sufficient acquaintance with parts of speech to be able to recognize the use of the words in the sentence remembering that the use determines the part of speech to which it belongs.

VI. Drill on verbs according to use:—transitive, intransitive and copulative; according to form:—regular and irregular: and conjugation of same in all the tense forms. Some drill in the use of the infinitive and participle.

VII. Knowledge of syntax.

VIII. Ability to compose letters of good form:—(a) friendship, (b) invitations, acceptance and regrets, (c) business forms, (d) application for a position.

IX. Practice in writing to train pupils to express clearly and connectedly what they have gained by experience, or what they have learned by reading.

X. Knowledge of the paragraph (only as divisions on the page), quotation marks, punctuation marks, use of capitals, and reproduction. A study of a few model compositions for forms of expression and outline.

XI. Ability to spell correctly all the words in common use. Pupils should early form the habit of consulting the dictionary. Their vocabularies may be strengthened and increased by daily study of new words. These words should be used in original sentences. They may be taken from literature read, or other sources. The work in English will be much improved by such study.

XII. Picture study may be used as a valuable aid in elementary English. Copies of the great masterpieces are easily obtained, and have not only a value as material for composition work, but are more important for their aesthetic influence.

SELECTIONS SUITABLE FOR MEMORY WORK IN GRADES VI, VII AND VIII.

Lincoln.—Address at Gettysburg.

Longfellow.—Psalm of Life, The Builders, The Ship of State, The Arrow and the Song, Excelsior.

Tennyson.—Charge of the Light Brigade, The Brook, The Bugle Song.

Bryant.—To a Waterfowl, Thanatopsis.

Whittier.—The Barefoot Boy.

Finch.—The Blue and the Gray.

Holmes.—The Chambered Nautilus, Old Ironsides.

Leigh Hunt.—Abou Ben Adhem.

Sam. Foss.—House by the Side of the Road.

Read.—Sheridan's Ride, Drifting.

Drake.—The American Flag.

Wordsworth.—The Daffodills.

Howe.—Battle Hymn of the Republic.

Shelley.—To a Skylark.

BOOKS FOR READING AND STUDY IN GRADES VI, VII AND VIII.

Longfellow.—Hiawatha, Courtship of Miles Standish.

Irving.—Legend of Sleepy Hollow, Rip Van Winkle.

Browning.—Pied Piper of Hamelin.

Dickens.—Christmas Carol.

Hawthorne.—Tanglewood Tales.

Whittier.—Snowbound.

Ruskin.—King of the Golden River.

Stowe.—Uncle Tom's Cabin.

Cooper.—Leatherstocking Tales.

Carroll.—Alice in Wonderland.

Defoe.—Robinson Crusoe.

Arnold.—Sohrab and Rustum.

Perry.—Odyssey.

Kipling.—Captain Courageous.

Lamb.—Adventures of Ulysses.

Chapin.—Story of the Rhinegold.

Pyle.—Story of King Arthur and his Knights.

Wiggin.—The Birds' Christmas Carol.

Page.—Santa Claus' Partner.

Scott.—Talisman.

Familiarity with a large number of the preceding books and poems is an essential part of any liberal education in the elementary school. To store the mind with the exact words of the authors who have

given us their best thought in beautiful form is far better than to commit useless mathematical formulas or technical definitions in any subject.

Several of the selections to be memorized should be chosen in each of the last three years of the course. A specific and somewhat accurate knowledge of three or four classics and a familiarity with eight or ten others, will give a broad foundation for high school English.

ARITHMETIC.

Pupils should show ability to solve problems of reasonable difficulty. A fair degree of speed and accuracy in handling the fundamental operations is expected. The following topics will suggest the scope of the work to be covered.

(a) The four fundamentals.

(b) Simple fractions: Addition, subtraction, multiplication and division.

(c) Decimals: Writing, reading, addition, subtraction, multiplication and division.

(d) Denominate numbers:—

1. Tables in use:
   - U. S. Money.
   - Avoirdupois Weight.
   - Dry Measure.
   - Liquid Measure.
   - Square Measure.
   - Linear Measure.
   - Cubic Measure.
   - Time Measure.
2. Reduction. Simple cases of ascending and descending.
3. Practical measurements.
4. Standard time (with geography).

(e) Principles of percentage with practical questions in profit and loss, insurance, taxes, commercial discounts, commission and brokerage, and simple interest (one method only), omitting questions in which time and principal are to be found.

(f) Negotiable paper and other business forms, as making out bills and keeping accounts (not formal bookkeeping).

(g) Ratio and simple proportion.

(h) Square root of small numbers, including integers, fractions, and decimals.

(i) Mensuration of surfaces.

GEOGRAPHY.

Pupils should be thoroughly informed about North America in the following:—

I. Latitude and longitude. Seasons. Zones.

II. Countries, United States, Canada, Mexico, Central America and Panama.

III. Physical features. Mountain systems, river systems, water sheds, lakes, peninsulas, gulfs and bays, straits and islands.

IV. Climate. Influence of elevation, removal of forests, nearness to the sea, prevailing winds, ocean currents, weather reports.

V. The United States with fuller detail.

1. Groups of States:—
   - (a) North Atlantic.
   - (b) South Atlantic.
   - (c) South Central.
   - (d) North Central.
   - (e) Western States.

2. (a) Location of States in each group with reference to the United States as a whole and the other countries of North America. Surface, climate, important rivers. Map drawing from memory.
   (b) Resources. Soil, forests, mineral and oil deposits, fisheries.
   (c) Industries and products. Agriculture, grazing, lumbering, mining, fishing, leading manufacturing, mechanical, professional and commercial pursuits.

3. Interstate travel and transportation. Trunk railroads. Steamship by lakes, by ocean. River navigation. Artificial irrigation. Immigration.

4. Cities. Location of one or more important cities in each of the leading states of the Union. Knowledge of about one hundred cities of North America with full information about Baltimore, Boston, Buffalo, Chicago. New York, New Orleans, Philadelphia, Pittsburgh, Quebec, San Francisco, Washington and Mexico.

5. Dependencies. Names, location, climate, important cities, people, industries and products. Advantages to the United States.

6. Pennsylvania should receive fuller treatment;—physical features, products, industries, people of the different sections of the State, areas in which farming, mining, oil, coal, soft and anthracite, predominates, relative position of counties, educanoted statesmen, scholars and poets, and chief centers of population.

VI. South America and Europe should be studied in a manner similar to that of North America but with less detail, giving considerable attention to relative position and comparative size of countries, physical features, commercial centers, chief industries, natural resources, trade routes, and some study of special significance, such as history, education, art, literature, religion, etc., of each of the following cities: Athens, Berlin, Constantinople, Florence, London, Paris, Rome, St. Petersburg, Rio Janeiro and Buenos Ayres.

VII. Asia, Africa, Australia and island groups should receive one full treatment. The success of this work will depend on how well the pupils have grasped the salient points and how thoroughly the details have been centered about these points.

HISTORY.

Pupils should be familiar with the following topics in American History.

1. Causes leading up to the discoveries in the new world.

2. The discoveries made by the different European countries, correlating the same with geography.

3. The Colonial period with special reference to the early history of Virginia, New York, Massachusetts and Pennsylvania. Also causes of emigration, character of settlers, geographical situation of each colony, with climate and physical features, and a study of a dozen or more persons who took a prominent part in the settlements.

4. Indian troubles.

5. The French explorations and their attempt to control the Ohio River.

6. The French and Indian War. The effects of the war.

7. Memorizing twelve dates with the events they represent between 1607 and 1763, the end of the French and Indian War.

8. The Revolutionary Period. Causes of the Revolution (a) general, (b) as enumerated in the Declaration of Independence. A half dozen statesmen of this period. Several chief events. Results of the war.

9. The critical period of 1783-1789. Commercial disputes, boundary conflicts, western territory. Ordinance of 1787. Constitution adopted. Articles of Confederation.

10. Explorations and acquisition of territory. The Louisiana Purchase. Lewis and Clark. Industries.

11. War of 1812. Causes, results, commercial independence.

12. A few dates and events between 1765-1815 should be committed to memory.

13. 1815-1860. National growth. North West territory. Acquisition of Florida. Admission of Texas. Mexican War. Acquisition of California. Great inventions. Tariff and revenue explained. The slavery question. Missouri Compromise; Compromise of 1850; Kansas and Nebraska Bill; John Brown; election of Lincoln.

14. 1860-1870. Civil War and reconstruction; Secession; On to Richmond; Coast blockade; Appomattox; Constitutional Amendments. Purchase of Alaska; Alabama claims.

15. 1870-1914. Industrial growth. Immigration. Spanish-American War. Peace Movement; Panama Canal. Reciprocity. About six dates with events between 1819 and 1914. Roosevelt and the Treaty of Portsmouth.

PHYSIOLOGY.

Pupils should be familiar with the divisions of the anatomy of the human body and with the general structure of the organs of digestion, respiration, the nervous system, and their main functions. He should be able to give the well established laws of health and the effects of stimulants and narcotics upon the organs of the body. The pupil should know what to do in case of accidents, and he should be acquainted with topics bearing on public health and sanitation.

TYPICAL PROGRAM OF STUDIES.

FIRST YEAR.

Required.	*Electives.*
English.	Latin.
Algebra.	German.
Drawing.	French.
	Household arts.
	Manual training.
	History.
	Introductory business.
	Civics.
	Agriculture.
	Commercial geography.
	Physical geography.

SECOND YEAR.

English.	Latin.
Geometry.	German.
Drawing.	French.
	History.
	Household arts.
	Manual training.
	Botany.
	Zoology.
	Biology.
	Agriculture.

THIRD YEAR.

English.	Latin.
	German.
	French.
	History.
	Physics.
	Commercial studies.
	Household arts.
	Algebra.
	Agriculture.

FOURTH YEAR.

English.	Latin.
	German.
	French.
	Economics.
	Chemistry.
	History.
	Solid geometry.
	Commercial studies.
	Household arts.
	Agriculture.

English should be required in each year of the high school. In high schools of all classes at least one unit of science, one unit of history, two units of mathematics, and two units of a foreign language should be required.

OUTLINES OF HIGH SCHOOL STUDIES.

ENGLISH.

It is universally agreed that English should be taught in each year of the high school. During the first two years approximately one-half of the time should be assigned to training in composition, and one-half of the time to the study of literature. High school schedules offering four recitations a week in English should assign during the first two years two periods each week to training in composition, and two periods each week to the study of literature, and during the last two years one period each week to training in composition and three to the study of literature. By the study of literature is meant the study of the works of good authors, not the study of a manual of literary history.

THE AIMS OF THE HIGH SCHOOL COURSE IN ENGLISH AS STATED BY THE COMMITTEE ON REORGANIZATION OF SECONDARY EDUCATION.

"The Committee believes that a single statement of aims will prove serviceable as a guide to the English work of all schools. Stated broadly, it should be the purpose of every English teacher, first, to quicken the spirit and kindle the mind and imagination of his pupils, and to develop habits of weighing and judging human conduct, with the hope of leading them to higher living; second, to supply the pupils with an effective tool for use in their future private and public life, i. e., the best command of language which, under the circumstances, can be given them.

The particular results to be sought may be somewhat specifically indicated as follows:*

I. In general, the immediate aim of secondary English is twofold:
   a) To give the pupil command of the art of expression in speech and in writing.
   b) To teach him to read thoughtfully and with appreciation, to form in him a taste for good reading, and to teach him how to find books that are worth while.

These two aims are fundamental; they must be kept in mind in planning the whole course and applied in the teaching of every term.

II. Expression in speech includes:
   a) Ability to answer clearly, briefly, and exactly a question on which one has the necessary information.
   b) Ability to collect and organize material for oral discourse on subjects of common interest.

*This outline, here considerably modified, was originally prepared by Allan Abbott, of the Horace Mann School, Columbia University, and appeared in the English Journal for October, 1912.

c) Ability to present with dignity and effectiveness to a class, club, or other group material already organized.

d) Ability to join in an informal discussion, contributing one's share of information or opinion, without wandering from the point and without discourtesy to others.

e) For those who have or hope to develop qualities of leadership, ability, after suitable preparation and practice, to address an audience or conduct a public meeting, with proper dignity and formality, but without stiffness or embarrassment.

f) Ability to read aloud in such way as to convey to the hearers the writer's thought and spirit and to interest them in the matter presented.

NOTE.—*All expression in speech demands distinct and natural articulation; correct pronunciation; the exercise of a sense for correct and idiomatic speech; and the use of an agreeable and well-managed voice. The speaker should be animated by a sincere desire to stir up some interest, idea, or feeling in his hearers.*

III. Expression in writing includes:

a) Ability to write a courteous letter according to the forms in general use, and of the degree of formality or informality appropriate to the occasion.

b) Ability to compose on the first draft a clear and readable paragraph, or series of paragraphs, on familiar subject- matter with due observance of unity and order and with some specific detail.

c) Ability to analyze and present in outline form the gist of a lecture or piece of literature, and to write an expansion of such an outline.

d) Ability, with due time for study and preparation, to plan and work out a clear, well-ordered, and interesting report of some length upon one's special interests—literary, scientific, commercial, or what not.

e) For those who have literary tastes or ambitions, ability to write a short story, or other bit of imaginative composition, with some vigor and personality of style and in proper form to be submitted for publication, and to arrange suitable stories in form for dramatic presentation.

NOTE.—*All expression in writing demands correctness as to formal details, namely, a legible and firm handwriting, correct spelling, correctness in grammar and idiom, and observance of the ordinary rules for capitals and marks of punctuation; the writer should make an effort to gain an enlarged vocabulary, a concise and vigorous style, and firmness and flexibility in constructing sentences and paragraphs.*

IV. Knowledge of books and power to read them thoughtfully and with appreciation includes:

a) Ability to find pleasure in reading books by the better authors, both standard and contemporary; with an increasing knowledge of such books and increasing ability to distinguish what is really good from what is trivial and weak.

b) Knowledge of a few of the greatest authors, their lives, their chief works, and the reasons for their importance in their own age and in ours.

c) Understanding of the leading features in structure and style of the main literary types, such as novels, dramas, essays, lyric poems.

d) Skill in the following three kinds of reading and knowledge of when to use each:

(1) Cursory reading, to cover a great deal of ground, getting quickly at essentials.

(2) Careful reading, to master the book, with exact understanding of its meaning and implications.

(3) Consultation, to trace quickly and accurately a particular fact by means of indexes, guides, and reference books.

e) The habit of weighing, line by line, passages of especial significance, while other parts of the book may be read but once.

f) The power to enter imaginatively into the thought of an author, interpreting his meaning in the light of one's own experience, and to show, perhaps by selecting passages and reading them aloud, that the book is a source of intellectual enjoyment.

NOTE.—*All bookwork should be done with a clear understanding, on the student's part, as to what method of reading he is to use and which of the purposes mentioned above is the immediate one. To form a taste for good reading it is desirable that a considerable part of the pupil's outside reading be under direction. To this end, lists of recommended books should be provided for each grade or term. These lists should be of considerable length and variety to suit individual tastes and degrees of maturity.*

V. The kinds of skill enumerated above are taught for three fundamental reasons:

a) Cultural. To open to the student new and higher forms of pleasure.

b) Vocational. To fit the student for the highest success in his chosen calling.

c) Social and ethical. To present to the student noble ideals, aid in the formation of his character, and make him more efficient and actively interested in his relations with and service to others in the community and in the nation.

NOTE.—*These fundamental aims should be implicit in the teacher's attitude and in the spirit of the class work, but should not be explicitly set forth as should the immediate aim of each class.*"

THE COURSE IN ENGLISH INCLUDES LITERATURE, COMPOSITION AND RHETORIC.

Oral Composition. Throughout the high school period much emphasis should be put upon oral composition. Training in correct oral expression not only prepares for better written work but it is unquestionably the "vital and essential form of language." Every

recitation whether conducted by the question and answer, topical or mixed method, offers excellent opportunities for oral composition. The topical recitation can be rambling and valueless, or it can be organized. It is the business of the teacher to demand the kind of topical recitation that calls for an assembling of facts in the mind and a grouping of the ideas in accordance with the principles of unity and coherence, the right choice of words and the proper use of connectives. The answers to large and fundamental questions in such subjects as history, physics or mathematics demand on the part of the pupil serious thinking in order to be understood by all members of the class. Fluency and skill in oral expression will come only from much oral practice with strict adherence to the principles of discourse. With the vocabulary enriched by a wide acquaintance gained through use with the guiding or relational words in sentences the frequent repetition of "and" in a brief oral composition will soon disappear. Much reading aloud regularly carried on by the pupils both in class and out of it will greatly aid in acquiring ease and fluency in oral expression. The debating society, too, offers an opportunity for oral expression. Here as in the recitation, pupils should be encouraged in communicating and exchanging ideas freely to compose well while loose or trivial discussions—work unbecoming the dignity of the school—should never be tolerated.

Rhetoric. A knowledge of the elementary principles of rhetoric will be valuable in practical English only in so far as this study aides in the interpretation of literature and as it furnishes a training in speaking and writing. There is often great waste of time to the pupils in putting stress on the laws of discourse as such instead of giving them a kind of training that leads to effective composition.

A good text-book on composition and rhetoric, for the majority of teachers, is quite indispensable. It should be a book in which the principles which govern good writing, and practice in the application of those principles, are not separated. Even when the book does not make such correlation, it must become the practice of the teacher to teach no law of expression without the instant application of that law, and make a constant demand for its application in all subsequent work, even after the study of that particular law as such, is over. The order and arrangement of topics must be adapted to the needs, capacities and interests of the pupils. Letter writing frequently appears well along toward the middle of a large number of books. It seems a great mistake to postpone instruction and practice in a form of composition which offers so easy and ready a means of approach to the more formal written work. The most fitting time for a systematic study of rhetoric and its application is during the second year.

One conclusion bearing on what shall be taught in rhetoric arrived at by Carpenter, Baker and Scott in The Teaching of English is "That the best method is one which, while not neglecting the study of correctness, lays most stress on the construction in the larger sense of the word,—the building up of a complete idea through a series of sentences or paragraphs."

Grammar. There will be abundant opportunities in the work in English during the four years by constant and continuous application and practice in the use of correct forms to strengthen and make permanent in the minds of the pupils the knowledge of grammar acquired in their earlier years. No doubt such topics as sequence of tenses, verbals, irregular verbs, phrases, clauses, prepositions with stress on the proper use with verbs, relative pronouns and syntax should, as the need arises, be given a fuller treatment than the immaturity of the pupils in the grades allowed. However, this should in no way make it seem necessary to assign a half or a larger portion of the first year to the study of grammar. When pupils show their inability to use correctly the relative pronouns in their oral or written composition, the need of instruction and drill in this topic is at once apparent and a real motive for such instruction is furnished. The study of Latin in the first year provides ample material for review in the essentials of English grammar.

The main point is to place the stress where it is needed. Instruction in topics of general and wide application should doubtless be given during a part of the period in composition. Now and then the reading period will furnish the occasion for effective drill. Frequently the pupil needs individual help and this requires sympathetic treatment. Standard text books in English Grammar should be provided or made easily accessible for *reference* by the pupils.

First Year.

Literature. The selection of the reading material in the first year depends largely on the extent of reading previously done by the pupils in the elementary grades. The controlling principle in determining the fitness of a selection is that it must be within the understanding of the pupils and that it will be of such a kind that will likely create a permanent interest in good reading. In schools where the pupils read well, the study of Homer's Odyssey and Shakespeare's Julius Caesar during the first half of the year will not only supplement the ancient history but furnish a variety of subject matter for discussion and written exercises.

The aim of the reading during this year should be for enjoyment and appreciation. Let it be rapid. Pupils like things to happen. Too much detail in analysis, study of words, and rhetorical features, becomes tedious and destroys interest. Attention should be given

to the main points, such as the plot, the back ground, the characters, and the personality of the author. The first two prose forms and the two poetic forms studied this year should be fully completed in class under the direction of the teacher. Not more than a month should be spent on any book. The time must depend on the length and nature of the book, the previous training and the aptitude of the class, and general interest. If the study of a book is to react upon the pupil's mind and power, it must not drag. Interest and appreciation may sometimes be aroused by a distinct change in the kind of assignment. The teacher's reading of a difficult, or an apparently uninteresting passage, will occassionally illuminate it to the class. There should also be considerable reading aloud by the pupils. Occassionally have a pupil read a selection or story unfamiliar to the class. This furnishes a real motive for reading and gives an opportunity to get proper control of breathing and voice through sustained effort.

After the teacher has been assured that he has aroused interest in a book through having read portions of it in class, he can safely assign the remainder of the story for home reading. Call for oral and written reports. Six or eight books are not too many to read during the first year. Pupils should be held responsible for the salient points, together with such details as are necessary to connect the story. They should be required to tell what is beautiful, what is forceful. A few elegant passages from each book read may be committed to memory. These should be reviewed frequently.

To arouse the interest so vitally necessary, and at the same time to give sequence to the study, a few of the Pennsylvania authors could be assigned during the first year for home reading. Young people are almost always interested in what occurs in their home state. A brief life sketch of the author should precede the reading of his book. All American writers should be grouped according to periods and geographical sections. The pupil does not need a manual of literature for this instruction. A note-book will be helpful.

The Sentence. The sentence being the unit of thought in both oral and written expression should be given a prominent place in the English of the first year. Careful attention should be given to the arrangement of the ideas in the sentence. Short periodic sentences should doubtless be taken up first as the long loose sentence requires long study before the full meaning is grasped. In the beginning of practice in writing sentences the teacher should aim to accomplish one thing at a time. The exercises should be repeated until some degree of proficiency is attained. This plan will guarantee far greater results than when several things are attempted in the same exercise. For a few days there should be instruction and practice in handling the participial phrases; at another time drill in the relative or

adverbial clauses, or in a correct use of connectives. To insure easy execution and grammatical correctness in the different forms of sentences, exercises involving these principles should be given almost daily during the first half of the year. Careful attention needs to be given to the correct placing of modifiers for clearness and emphasis, and the use of proper transitional words. Inability to make one's thought clear is frequently due to poverty in the use of words indicating relation. To overcome this weakness it will be well to give pupils instruction in the different words expressing close relation as they occur in sentences.

Punctuation. In the first year there should be systematic instruction in punctuation. Teach the simplicity of the rules. Omit all marks that are not necessary to bring out the complete meaning. Since punctuation is for the clear understanding of a sentence, insist that the mark be inserted during the construction of the sentence, and not at the completion of it. Pupils should note carefully punctuation marks as used in the best newspapers, magazines and in good literature. The final test of power in the pupil's own work should be his own reading aloud, through which he will discover whether he has indicated on the page every pause that is necessary to make intelligible reading possible.

Written Composition. The aim of all composition work is to develop in the pupil the ability to speak and write easily, naturally and effectively. Written expression calls for a wide range of application in the first year. While during this year the chief emphasis is to be placed upon description, pupils should be given much freedom in writing compositions. For the sake of variety and interest pupils should be given considerable practice in composing news items, telegrams, imaginative stories, business and social letters of all kinds. A reasonable degree of proficiency in composing well constructed letters should be demanded of all pupils as a part of the work to be accomplished.

Only an informal presentation of the paragraph and the composition as a whole should be attempted. The subjects assigned or selected for the frequent short themes should not be too broad to admit of treatment within the narrowed limits of composition writing. For this reason limited or specific subjects furnish better topics than do general. The subjects are to be within the experience and comprehension of the pupil. There should be during the year at least three themes of sufficient length to test the pupil's ability and power to organize his material. To aid in securing unity, coherence, and proportion in composition plenty of practice should be given in outlining subjects. These need not all be written. While careful attention is to be given to the external form of the composition, such as arrangement on the paper, indentation, margin, punctuation, capi-

talization, spelling, etc., the main criticism should be directed at sentence structure, the thought, and the proper use of words. It must be remembered that the greatest and most permanent value to the pupil comes from the fair criticism offered on the composition he has written, and not from the direction given on writing themes, necessary as these may be. It is largely through sympathetic and just criticism that the pupil can hope to overcome his faults. The importance of having all compositions corrected is not far to seek. Pupils should be required to criticise and improve their own productions. This leads to self-education.

For composition work in the first year the following outline is suggested:

I. The Sentence.
1. The sentence, the unit of thought.
2. Kinds of sentence,
   (a) Simple, compound, complex.
   (b) Balanced, loose, periodic.
3. Elements of sentence structure to be taught: Concord of subject and predicate. Relative and antecedent. Placing of modifiers. Placing of correlatives. Balancing clauses of the same rank together. The use of *who, which,* and *that.* Repetition of prepositions, etc., for separation of idea, or for clearness of structure. Distinction between predicate adjective and adverb of manner. The use of the possessive. Case of pronouns. Correct use of irregular verbs. Sequence of tenses. The introductory gerund and participle always governed by the subject of the clause. The avoidance of the clumsy passive and dangling participles.
4. Punctuation.

II. The Composition as a whole.
1. Subjects: General, limited.
2. The paragraph, the unit of discourse.
3. Parts: (1) Introduction, (2) Discussion, (3) Conclusion, with careful attention to transition from part to part.

III. Kinds of writing and order in which they are to be taught: (1) Description, (2) Narration, (3) Exposition, as suggested in (8) under IV.

IV. Source material for oral and written work.
(1) Topics within the experience of the pupils.
(2) Topics read (1) by the pupil (2) by the teacher.
(3) Practice in writing many letters of all kinds.
(4) Writing and answering telegrams.
(5) Pictures.
(6) Accidents and incidents.
(7) Reviews or reports of books and articles.
(8) Explanation of games (how to play them—exposition) How to make things and how to grow things (in deference to the manual training, domestic science, and agriculture).
(9) Report of games (narration and description).
(10) Classics studied during the year.
(11) Justification of some statement with more than surface meaning. (To make the pupil think below the surface).

V. Word Study. Value of specific words, synonyms, etc.

VI. Figures of speech—as the simile and metaphor.

Second Year.

Literature. The reading of this year should be done in a similar manner to that of the first, with fuller detail and more discussion, including a closer study of the author, period in which he lived, and a grouping of authors into important periods. In this year pupils should be made familiar with the best periodical literature,—such as Harper's, Scribner's, Century, Atlantic Monthly,—and magazines, reviews, and daily newspapers, particularly the editorial pages, of like grade and worth. Continue the study of contemporary Pennsylvania writers.

Composition. The composition work of this year should enlarge upon the principles of writing. Give continuous and careful attention to oral composition as found in the previous year. To allow pupils to use incomplete or incorrect sentences in topical recitations will surely defeat the main purpose of instruction in English. All teachers in all departments must co-operate to bring about the desired result. The development of the paragraph in accordance with the principle of unity, coherence and emphasis and the composition as a whole should receive systematic treatment. There should be practice in all forms of composition, narration, description, exposition and argumentation, with emphasis upon exposition. This will give pupils an opportunity to find themselves. The subjects for the frequent short and occasional long theme may be taken from the lit-

erature read, from the school studies, from current topics; or more valuable still, from personal interest, intended vocation, environments, occupation, and personal opinions. In this year greater accuracy and force in expression is urged. Continue practice in sentence structure, drill in use of words and practice in writing different forms of letters.

Third Year.

Literature. The general purpose of instruction in literature in the third year is to develop in the pupils the power to appreciate the different types of literature, an acquaintance with the masterpieces of thought and expression, a standard of judgment so sound as to become a touch-stone of taste. The study of the classics may now be made more intense than the previous years. Together with the plot, the style of the author and historical setting give the pupils an intelligent interest in some of the literary types such as the romantic novel, tragedy and comedy, narrative and didactic poetry, epic and lyric verse. Give incidental but thorough attention to such geographical, historical, biblical, literary, and mythological allusions, as are necessary for a proper interpretation of literary works, and helpful in the comprehension of general reading after school age. From each work read have certain elegant passages committed to memory. Allow the pupil to choose for himself at least half the selection for memorizing.

Composition. Practice in writing compositions of all kinds is to be continued. Let the treatment of the paragraph and the whole composition be more elaborate. At least one short theme or exercise each week and a longer theme each month should be required.

The subjects may be taken from many sources, such as literature, studies, history, topics of current or national interest or those in which pupils are personally interested. Continue letter writing with emphasis on business letters. Keep oral expression prominent in its varied forms such as, the topical recitations, impromptu speech or prepared reports and addresses.

The nature of the criticism of both oral and written composition should be constructive. This should always be given in the attitude of sympathy.

Fourth Year.

Literature. The aim of the work of the fourth year should be to develop in the pupils the discriminating ability necessary to appreciate literary values. Greater demands are made upon the pupils

by testing their ability to interpret and their power to think logically and coherently. In this as well as in the previous years the reading should be selected from all the literary types. At least one essay, one oration, and one selection from poetry should be studied. Some attention, if time permits, may be given to the study of the history of English and American literature, but this is to be subordinated to the study of the works of authors. Give careful attention to the topics of authors studied, periods in which they lived and wrote, what motives prompted them to write, and the influence of each. Also study the important periods in English literature with the view to gathering the relation of the same to the historical movement in civilization. The memorizing of select passages should be continued throughout the year. Pupils should be allowed to choose at least half of the selections to be memorized.

Composition. The practical work in English should include all the forms of writing with emphasis on argumentation. During this year the important parts of rhetoric may be studied in greater detail, and those omitted in previous years taken up. The material for composition may be selected from a wide range of topics, such as literary readings, critical opinions or reviews of books, summaries of debates, character sketches, and news items. Some encouragement might be given to writing verse. At least one short written exercise each week and one longer production every six weeks should be required. These should show completeness of form, unity, good diction, coherence, strength and clearness. Criticism, however, must not discourage free expression. Watch the oral work, and welcome the opportunities to increase the pupil's power in oral expression.

BOOKS FOR READING AND STUDY.

First Year.

Longfellow.—Evangeline. The Courtship of Miles Standish.
Lowell.—Vision of Sir Launfal.
Irving.—Sketch Book. Tales of a Traveler.
Hawthorne.—Twice Told Tales. The Gray Champion.
Cooper.—The Last of The Mohicans.
Whittier.—Snowbound.
Browning.—Cavalier Tunes.
Shakespeare.—Julius Caesar.
Tennyson.—The Brook.
Lanier.—The Brook.
Scott.—Ivanhoe. The Lady of the Lake.
Palmer.—Odyssey.
Parkman.—Oregon Trail.

Thoreau.—Walden.
Stevenson.—Treasure Island.
Van Dyke.—The Other Wise Man.
Van Dyke.—Days Off.
Taylor.—The Story of Kennett.
Read.—The Wagoner of the Alleghenies.

Second Year.

Addison and Steele.—Sir Roger de Coverly Papers.
Coleridge.—Ancient Mariner.
Eliot.—Silas Marner.
Shakespeare.—Merchant of Venice.
Gaskill.—Cranford.
Macaulay.—Essay on Lord Clive.
Lincoln.—Selections including at least the "Two Inaugurals," the Speeches in Independence Hall and at Gettysburg, the Last Public Address and Letter to Horace Greeley.
Poe.—The Gold Bug.
Goldsmith.—The Vicar of Wakefield.
Arnold.—Sohrab and Rustum.
Scott.—Quentin Durward.
Lamb.—Tales of Shakespeare.
Dickens.—Oliver Twist.
Hughes.—Tom Brown at Rugby.
Schurz.—Life of Lincoln.

Third Year.

Browning.—How They Brought the Good News.
Evelyn Hope. Herve Riel.
Home Thoughts from Abroad.
Pheidippides.
Washington.—Farewell Address.
Webster.—First Bunker Hill Oration.
Stevenson.—Inland Voyage.
Hawthorne.—The Scarlet Letter.
Burke.—Speech on Conciliation with America.
Tennyson.—Idylls of the King. Lancelot and Elaine.
The Coming of Arthur. Gareth and Lynette.
Holy Grail.
Tennyson.—The Princess.
Emerson.—Representative Men.
Lowell.—Poems.
Whittier.—Poems.
Ruskin.—Sesame and Lilies.

Prescott.—Conquest of Mexico.
Hillis.—Great Books on Life Teachers.
Thackeray.—Vanity Fair.
Lytton.—Last Days of Pompeii.
Kingsley.—Westward Ho.
Van Dyke.—The Blue Flower.
Byron.—Prisoner of Chillon.

Fourth Year.

Macaulay.—Life of Johnson.
Carlyle.—Essay on Burns.
Shakespeare.—Macbeth.
Milton.—L' Allegro, II Pensoroso, and Comus.
Dickens.—Tale of Two Cities.
Mandeville.—Travels.
Marlowe.—Jew of Malta.
Goldsmith.—She Stoops to Conquer.
Hawthorne.—The Marble Faun.
Dickens.—Sketches by Boz.
Thackeray.—Henry Esmond.
Milton.—Paradise Lost.
Holmes.—Autocrat of the Breakfast Table.

Books every teacher of English should have:

1. Report of Committee of Ten. American Book Co.
2. Chubb, Teaching of English in the Elementary and Secondary Schools. Macmillan Co.
3. Carpenter, Baker and Scott, Teaching of English. Longmans, Green & Co.
4. Heydrick, How to Study Literature. Hinds, Noble & Eldredge.
5. McMurray, Special Method in the Reading of English Classics. Macmillan Co.
6. Straughn, Home Authors, Pennsylvania. Union Book Co.
7. The English Journal. The University of Chicago Press.
8. Hinsdale, Teaching the Language Arts. American Book Co.
9. Bates, Talks on the Study of Literature. Houghton.
10. Mabie, Books and Culture. Dodd Mead & Co.
11. Johnston, High School Education. Scribners.
12. Hollister, Administration of High School. D. C. Heath & Co.
13. Brown, The American High School. Macmillan Co.
14. Sachs, The American Secondary School. Macmillan Co.

LATIN.

It is to be carefully noted that a period of nine months should be required to prepare for reading Caesar. In high schools with terms of seven or eight months it is suggested that an additional month or two of the second year be taken to complete this preparation. This will give five or six months for Caesar. During this time, if the preparatory work has been well done, pupils should read two or three books. It is not meant, however, to sacrifice quality for quantity. High schools maintaining a three years' course should omit Virgil entirely.

The following is a brief summary of the things to do and the things to avoid in teaching Latin; it is taken from the report of the Committee of Ten on secondary school studies.

The teacher of elementary Latin need not concern himself too much with the remote ends of the study. To him the question should be: What knowledge is of prime importance, as the foundation for subsequent work? Stated generally, it may be said that the work of the first period should be (1) learning to pronounce accurately and to read fluently and intelligently the Latin text of what has been studied; (2) the mastery of inflection, so that number, case, person, mode, tense, etc., can be instantly recognized and conversely, can be formed without much hesitation by the student himself; (3) the acquisition of a working vocabulary of from one to two thousand words; (4) the mastery of the order of the Latin sentence; (5) the mastery of the simpler principles of syntax regarded as a means of expression; (6) learning how to understand simple narrative in Latin; (7) learning how to translate such narrative into true English. In necessary connection with the pursuit of these aims, a good deal of training of the ear should be employed, through listening to the reading or speaking of the teacher; and, in addition, a certain amount of practice in turning English into Latin will be necessary, as an indispensable instrument for fixing forms in the memory and establishing a feeling for their syntactical powers. On the other hand, the things to be avoided are (1) a dispersion of effort in consequence of the attempt to include too many parts of the study in the first stage; (2) an undue prominence of rules, and the treatment of syntax as an end in itself, rather than as an auxiliary to the penetration of the sense; and (3) the use of "translation English."

COURSE OF STUDY.

First Year.

Beginner's Latin book completed.

25 to 30 pages of easy reading from Fabulae Faciles or Viri Romae.

In the study of a foreign language the work of the first year is all important. The essentials necessary for further study and a proper understanding of the language must be well mastered. Thoroughness in the elements of Latin is the keynote of successful work. The main emphasis at the beginning should be directed at (1) learning forms and (2) acquiring a vocabulary. Teachers should be particularly careful to have pupils learn accurately the words that are likely to be most useful in their reading. The importance of thoroughness calls for variety in handling the daily exercises. Much oral practice not only develops and quickens the ear but greatly vitalizes the language work. Make the drill exercise vigorous. Let a part of each recitation be given to practice in pronunciation. Insist on having pupils read by phrases and clauses rather than by single words. From the beginning the teacher will find it exceedingly helpful to read the whole lesson to the class. As the occasional reading of a sentence in class is insufficient practice to guarantee accuracy and fluency in pronouncing the Latin, encourage the pupils to read the whole lesson aloud outside of class. Training in intelligent reading of the Latin will prove a great stimulus to good work. To secure the mastery and permanency of the knowledge daily acquired, there must be constant and continuous reviewing of the work covered. The feeling of power thus gained will be a strong incentive for further study. In translating, especially at the beginning, observe the Latin order. After the rendering according to the order of the words, idiomatic English must be required. Emphasize the importance of the choice of proper words. Herein lies our chief reason for instruction in Latin.

Second Year.

Standard Latin Grammar.

Caesar's Gallic War, 4 books, or its equivalent from Viri Romae and Nepos.

The course in second year Latin should include the following topics: forms, vocabulary, syntax, derivation of words, translation, interpretation of the narrative, and Latin prose composition. To prepare the pupils to meet the difficulties they will encounter in the larger vocabulary and the great variety of construction in the first half dozen chapters of Caesar, it is recommended that the first two weeks be spent in reviewing and studying the paradigms and more difficult principles of syntax learned at the close of the first year. Much of the material used in this work should be taken from the first few chapters of Caesar. It should include examples of the gerund and gerundive, infinitive of indirect discourse, pure purpose clauses, *quin* clauses after verbs of doubting, and a variety of unusual case constructions.

The study of the vocabulary is a very important phase of this year's work. This is especially true of the principal parts of verbs, of which about 300 should be learned. These should be written in note books for study and drill. There should be frequent reviews of the irregular verb forms.

The value of the study of syntax can not be questioned. It should be studied in connection with the text by explanation of the construction. Latin prose composition offers an excellent means for applying the principles of syntax. It is considered a waste of time to make a practice of asking the syntax of every word in the sentence or chapters. In order to clarify a difficult passage it is well to select from other parts of the book a number of passages of similar construction. In this way the pupils have their attention directed at one difficulty for a sufficient length of time to fix the unusual and troublesome forms of syntax. Good results are often secured in both syntax and translation by having difficult passages written upon the black board. From this the relation of the words can easily be shown and a good English rendering can be secured.

The success of the year's work depends largely on the way the pupil is taught to prepare his lesson. The subject and the verb of the principal clause and of the subordinate clauses, if the sentence contains them; the grouping of words and phrases; the use of connectives or transitional words—all these need full explanation before the pupil should be expected to go it alone. In preparation the natural order should be followed, then the sentence is to be rendered in good English. Encourage pupils to choose the right English word in translating. To acquire fluency and smoothness in translating there must be constant reviewing of the ground covered. The first fifteen chapters might wisely be read six times before the book is completed. The lesson of the previous day should always be reviewed. This may be done by one or two pupils. A "back review" with several chapters intervening and always considered a part of the lesson will do much to give permanency to the translation besides giving power to attack new lessons.

The Latin should be read aloud throughout the year. For sufficient practice to give smoothness and ease in reading pupils should be urged to pronounce the Latin outside the class. The Latin should be read aloud frequently by the teacher for the purpose of giving the ear training so essential in language study. There should be much practice in translating easy passages from hearing the Latin read.

Some attention should be given to the study of the history of the period and the geography of the country. Pupils should be required to trace the movements of campaigns on maps. To this end certain chapters should be grouped and the narrative of them written.

One recitation each week in Latin prose is recommended. There hould be frequent easy oral exercises in Latin prose. Only a few inutes should be given to these exercises.

Third Year.

Standard Latin Grammar.
Cicero, four orations against Catiline.
Manilian Law oration.
Archias oration.
Topics to be covered: Vocabulary, syntax, written translations, Homeric traditions, arguments, theme writing, study of author's tyle, Latin prose, and sight reading.

The suggestions in the outline for the second year apply with equal orce to the work of the third year. There will be occasion for drill n forms and principles of syntax and careful analysis of sentences aken from the text read. Grammar questions should precede or fol- ow rather than interrupt the translation.

Fluency and accuracy in translation should be the chief aim of he course. To secure this end there must be constant reviewing of he pages read and careful choice of English words.

Opportunities for practice and sight translation must be offered requently but care should be taken to avoid too difficult Latin for his purpose. At least half of the third and fourth orations of Cati- ne might be read at sight. In this way many classes are able to ead an additional oration. The controlling principle in selecting assages from other authors for sight reading is that it must be omparatively easy Latin. Many good teachers of Latin make pro- ress rapidly by having the pupils read in advance of the assignment. By this method the pupils seem to gain power and confidence seldom cquired in the ordinary translation.

Fourth Year.

Standard Latin Grammar.
Virgil's Aeneid, six books.
Topics to be covered: Vocabulary, syntax, written and sight trans- ations, Greek mythology, Roman customs and religion, the geogra- hy of the Mediterranean, scansion and rythmical reading of hexa- neter verse.

The change from prose to Latin poetry presents to the pupil varia- ions from the normal prose forms of expression. There is not only change in form but also a change in spirit. To understand more ully the time and the spirit in which the Aeneid was written, some ttention should be given to the history that deals with the earliest

Roman traditions, Greek mythology, Roman religion, and the life of the author. Some systematic studies and reference work will be necessary to an adequate grasp of these aspects of the poem. The poem should be studied as a literary masterpiece.

From the beginning attention should be given to scansion and rythmical reading. Before this is undertaken, some instruction dealing with the technical side of scansion should be given. Practice in reading single lines with the verse accent should be followed with metrical reading of lines and groups of lines. In connection with the translation metrical reading should receive enough attention to give the pupil a clear understanding of the structure and quantity of hexameter verse.

In the translation of poetry, accuracy in expressing the Latin thought and care in the use of words should be constantly required.

"The writing of Latin should be carried on throughout the year concurrently with the reading of the text. The main training in syntax should be given in connection with work in writing Latin. The basis of the exercises in Latin composition should be limited portions of the text of the authors read,—perhaps not more than 40 or 50 pages."

Equipment for Teaching Latin.

Kiepert's Ancient History maps. Rand, McNally.

Kiepert's or Sanborn's classical atlas.

Galey, Classic Myths in English Literature. Ginn & Co.

Gow, J., A Companion to School Classics. The Macmillan Co.

Johnston, H. W., The private Life of the Romans. Scott, Foresman and Co.

Becker, W. A. Gallus, or Roman Scenes of the Times of Augustus. Longmans, Green and Co.

Brooks, Edward, Story of the Aeneid.

Wilkins, Primer of Roman Literature. The Macmillan Co.

Froude, Caesar, A Sketch. Scribner's Sons.

Forsythe, Cicero. Scribner's Sons.

Sellar, Virgil, G. P. Putman Sons.

Peck, The Roman Pronunciation of Latin. Henry Holt and Co.

Report of the Committee of Ten. American Book Co.

Byrne. "The Syntax of High School Latin." The University of Chicago Press.

Lodge, "The Vocabulary of High School Latin." Teachers College, New York.

Abbott, "The Common People of Ancient Rome." Scribners.

GERMAN.

The course in German covers four years. No foreign language should be studied for a period shorter than two years; neither should two languages be begun at the same time. In a third grade high school it is recommended that pupils pursue but one foreign language. Teachers are urged to guard against selecting reading texts that are too long and difficult.

The following suggestions are taken from the report of the Committee of Twelve of the Modern Language Association of America. Inasmuch as only a very small part of this report can be reprinted here, every teacher of German or French is urged to secure a copy.

The Elementary Course in German.

A. The aim of the instruction.

At the end of the elementary course in German the pupils should be able to read at sight, and to translate, if called upon, by way of proving his ability to read, a passage of very easy dialogue or narrative prose, help being given upon unusual words and constructions, to put into German short English sentences taken from the language of every-day life or based upon the text given for translation, and to answer questions upon the rudiments of the grammar as defined below.

B. The work to be done.

During the first year the work should comprise: (1) careful drill upon pronunciation; (2) the memorizing and frequent repetition of easy colloquial sentences; (3) drill upon the rudiments of grammar, that is, upon the inflection of the articles, of such nouns as belong to the language of every day life, of adjective pronouns, weak verbs, and the more usual strong verbs, also upon the use of the more common prepositions, the simpler use of the modal auxiliaries, and the elementary rules of syntax and word order; (4) abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (5) the reading of from 75 to 100 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson, the teacher giving the English and in the reproduction from memory of sentences previously read.

Second Year.

During the second year the work should comprise: (1) the reading from 150 to 200 pages of literature in the form of easy stories and plays; (2) accompanying practice, as before, in the translation into

German of easy variations upon the matter read, and also in the off-hand reproduction sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill upon the rudiments of grammar, directed to the ends of enabling the pupil, first, to use his knowledge with facility in the formation of sentences, and, secondly, to state his knowledge correctly in the technical language of grammar.

Third Year.

The work should comprise, in addition to the elementary course, the reading of about 400 pages of moderately difficult prose and poetry, with constant practice in giving, sometimes orally and sometimes in writing, paraphrases, abstracts or reproductions from memory of selected portions of the matter read; also grammatical drill upon the less usual strong verbs, the use of articles, cases, auxiliaries of all kinds, tenses and modes (with special reference to the infinitive and subjunctive), and likewise upon word order and word formation.

Fourth Year.

The work of the advanced course (last year) should comprise the reading of about 500 pages of good literature in prose and poetry, reference reading upon the lives and works of the great writers studied, the writing in German of numerous short themes upon assigned subjects, independent translation of English into German.

COURSE OF STUDY.

First Year.

Beginner's German book. Readers suitable for this year:

Gronow's Jung Deutschland; Guerber's Marchen; Leander's Traumereien; and Kleine Geschichten; Meissner's Aus meiner Welt; Wildenbruch's Das Edle Blut.

For memorizing: Heidenröslein; Vergissmeinnicht; Wanderers Nachtlied; Erinnerung; Du bist wie eine Blume.

Second Year.

German grammar.

Readers: Anderson's Bilderbuch ohne Bilder and Träumereien; Gerstacker's Germelshausen; Storm's Immense; Hillern's Höher als die Kirche; Heyse's L'Arrabbiata or Anfang und Ende; Manley's Ein Sommer in Deutschland.

For memorizing: Die Lorelei; Der gute Kamerad; Wacht am Rhine.

Third Year.

Standard German grammar.

Readers—Freytag's Karl der Grosse; Goethe's Hermann und Dorothea; Moser's Der Bibliothekar; Die Jungfrau von Orleans or Wilhelm Tell; Aus dem deutschen Dichterwald.

Lessing's Minna von Barnhelm; Hoffman's Historische Erzalungen.

Pope's or Whitney and Stroebe's German Composition.

Fourth Year.

Standard German grammar.

Freytag's Soll und Haben.

Hauff's Lichtenstein.

Schiller's Maria Stuart.

Goethe's Dichtung und Wahrheit or Egmont.

Lessing's Emila Galloti.

Fulda's Der Talisman. Grillparzer, Des Meeres and der Liebe Wellen.

Books for teachers:

Report of the Committee of Twelve. D. C. Heath and Co.

Report of the Committee of Ten. American Book Co.

Methods of Teaching Modern Languages. D. C. Heath and Co.

Bagster Collins, The Teaching of German in Secondary Schools. Macmillan Co.

Hosmer's, A Short History of German Literature. St. Louis, G. J. Jones and Co.

Priest's Short History of German Literature. Scribner.

Kron's German Daily Life. Newson and Co., N. Y.

Studies in German Words and their Uses.

Bahlsen, "The Teaching of Modern Languages." Ginn and Co.

Brebner, "The Method of Teaching Modern Languages in Germany." Macmillan.

Breul, "The Teaching of Modern Foreign Languages in Secondary Schools." Macmillan.

Jespersen, "How to Teach a Foreign Language." (translated), Macmillan.

Taylor, "History of Germany."

Thomas, "German Grammar." Holt.

Map of Germany. Rand McNally.

FRENCH.

The course in French covers a period of two years. In case any high school desires this study pursued for a longer time, the report of the Committee of Twelve will help such in the selection of the material. In the course outlined, French is begun in the third year of the high school.

The following suggestions on the amount of work to be done are taken from the report of the Committee of Twelve:

The Elementary Course in French.

During the first year the work should comprise: (1) careful drill in pronunciation; (2) the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural of nouns, the inflection of adjectives, participles and pronouns; the use of personal pronouns, common adverbs, prepositions, and conjunctions; the order of words in the sentence, and the elementary rules of syntax; (3) abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the production of natural forms of expression; (4) the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read (the teacher giving the English), and in reproducing from memory sentences previously read; (5) writing French from dictation.

During the second year the work should comprise; (1) the reading of from 250 to 400 pages of easy modern prose in the form of stories, plays or historical, or biographical sketches; (2) constant practice, as in the previous year, in translating into French easy variations upon the texts read; (3) frequent abstracts, sometimes oral and sometimes written, of portions of the text already read; (4) writing French from dictation; (5) continued drill upon the rudiments of grammar, with constant application in the construction of sentences; (6) mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

COURSE OF STUDY.

Third Year in the High School.

French Grammar, such as Aldrich and Foster's Elementary French, or Fraser and Squair.

French Reader, such as Aldrich and Foster's, A French Reader, or Super's Preparatory French Reader.

French Texts; Bruno's Le tour de la France; Erckmann—Chatrian's Waterloo, or Le conscrit de 1813.

Memory selections; Au clair de la lune; Le corbeau et le renard; La cigale et la fourmi; Historical anecdotes.

Fourth Year in High School.

French Grammar, such as Aldrich and Foster's Elementary French, or Fraser and Squair.

French Texts; Halevy's L'Abbe Constantin; Foncin's Le pays de France; Merimee's Colomba; About's Le roi des montagnes; Labiche et Martin's Le voyage de M. Perrichon.

Memory selections; Le vase brise; Le rat de villa; Le feuille; La source; Anecdotes.

MATHEMATICS.

The following aims for instruction in Mathematics have been advanced:—

1. To interest pupils in mathematics, both as a subject by itself and as applicable to science and to commercial and industrial life.

2. To establish habits of accuracy, of verifying results, of promptness and neatness of work, which can be carried into other lines of study and also into business.

3. To give pupils those forms of reasoning and that training in logic that shall be helpful in other lines of work. The teacher's constant aim should be to train the pupil to think and to formulate clearly the results of his thinking.

The arrangement of the course in Mathematics recommended in the program of studies on page (14) places Algebra in the first year and Geometry in the second year. Both studies are required. In the third year pupils may elect either a half or a whole year of Algebra. In the fourth year pupils may elect solid Geometry and Trigonometry, or solid Geometry and Arithmetic, a half year each.

It may be advisable to omit from the work of the first year parts of topics as found in some text books. This will give an opportunity to secure greater thoroughness in the fundamentals of Algebra. The following topics might well be omitted; Long examples in multiplication and division, complex fractions, unusual forms of factoring, and certain types of statement problems as fox and hound, "train" problems, and time problems.

The method of the recitation has a distinct bearing on the progress and success of the work in Algebra. In many recitations much time is wasted because the teacher fails to keep all the pupils busy all the time. Instead of using the recitation period to test the pupils on the problems they have worked or had assigned to them a type of recitation that devotes a large part of the period to the next day's lesson is recommended. To this end there should be sufficient instruction by way of illustration and explanation of principles to develop clear notions of a new lesson. This instruction can be made effective by applying these principles to a variety of easy problems. Each pupil should be allowed to work as many problems as he can. To secure independent effort pupils should be required to work at their seats or desks. In this way it becomes easy for the teacher to determine if further instruction is advisable and to give assistance where it is needed. Should many pupils show inability to work the questions assigned further instruction should be given. The teacher should see that a maximum of work is accomplished by every pupil.

To assign pupils long and involved problems which consume the whole recitation period seems like wasteful practice. This type of problem could well be placed on the board by the teacher or a pupil mainly for the purpose of explanation. Some drill for speed and skill in handling the mechanical processes is needed but it should be regarded as subordinate to the training in thought. To give opportunity for the latter kind of training a part of the recitation period should be used occasionally in interpreting and making statements of problems. The mechanical process of these problems may be performed by the pupils at their seats.

Frequent reviews are essential. In teaching equations in first year do not emphasize "transposition" and "clearing of fractions" but let the appeal be to fundamental processes. In simultaneous equations, the "addition-subtraction" method of elimination should prevail, though the others should be understood. In quadratics, teach thoroughly one method of completing the square. In many problems the best one is that which calls for dividing by the coefficient of x^2. Also teach the methods of solution by factoring, and by use of the formula.

The courses in Algebra are in accordance with the recommendations of the College Entrance Examination Board.

ALGEBRA TO QUADRATICS.

One Unit.

1. Definitions and notations.
2. The four fundamental operations for rational algebraic expressions.

3. Solution of simple equations using x and other symbols as unknowns.
4. Factoring with its application to H. C. D. to L. C. M. and to fractions.
5. Fractions including ratio.
6. Linear equations, both numerical and literal, containing one or more unknown quantities, with attention to graphs of equations in two quantities.
7. Involution and evolution with positive integral exponents.
8. Radicals, including the extraction of the square root of polynomials and of numbers.
9. Exponents, including the fractional and negative.

ALGEBRA, QUADRATICS AND BEYOND.

One-half Unit.

1. Review of the essentials in first year's work, using more difficult problems.
2. Quadratic equations, both numerical and literal.
3. Simple cases of equations with one or more unknown quantities, that can be solved by the methods of linear or quadratic equations.
4. Binomial theorem for positive integral exponents.
5. Problems depending on quadratic equations.
6. Ratio proportion and variation.
7. The formula for the nth term and the sum of the terms of arithmetical and geometrical progressions.
8. Solution of practical problems from mensuration, from physics, and from commercial life.
9. Graphic solution of problems.

ADVANCED ALGEBRA.

One-half Unit.

1. Permutations and combinations, limited to simple cases.
2. Complex numbers, with graphical representations and sums and differences.
3. Determinants of the second, third and fourth orders including the use of minors and the solutions of linear equations.
4. Numerical equations of higher degree, and so much of the theory of equations, with graphical methods as is necessary for their treatment, including Descartes' rule of signs and Horne's method.

PLANE GEOMETRY.

The subject may be completed in nine months. Time may be gained by going very slowly in the first book. It is to be remembered that appreciation of the meaning of demonstration and the form to be observed comes slowly to many pupils. To encourage originality from the start, encourage pupils to construct the figures from the theorem before studying the one drawn in the book. Point out to pupils the importance of observing the sequence of propositions. Accurate constructions both at the board and on paper should be required. The method of having pupils write out daily the demonstrations at the board is of very doubtful value. The theorem written on the book and figures clearly drawn and plainly marked together with what is given and what is to be proved, are all that are necessary. Insist upon accurate expression in all demonstrations. Great care must be taken to avoid making the study of Geometry a mere memory exercise.

The time to teach the definitions of new terms is when the time arrives for using them. It should be remembered that certain terms in Geometry must be mastered. Teachers should give careful attention to instilling a clear concept of simple geometric terms such as line, point, space, angle, etc., and less to exact definition. Pupils beginning the study will be aided in grasping the meanings of definitions by studying them in connection with geometrical figures. "The important thing about the definition that is to be memorized as a basis of proof is to make it as nearly scientific as the powers of a beginner will justify."

The final report of the National Education Association Committee of Fifteen recommends "That in elementary Geometry the nature of incommensurables and limits be explained but that the subject no longer be required for entrance to college." During the recitation period all text books should be closed. Except for assigning lessons and working supplementary exercises, the books might well be left at the desks. The instruction on the advance theorem should especially, if it is likely to present difficulties to a number of pupils, consist of a careful reading of it by the class and developing of an intelligent understanding of the same by clarifying questions. The teacher's final estimate of the pupils ability is gained in a large measure from what he can do in class.

As the chief aim of geometry is to develop independent thinking, the teaching of originals becomes a very important phase of the work. A hundred suitable and well-graded original exercises should be a minimum requirement. Pupils capable of doing more should be assigned more. Work on originals should accompany the demonstrations in order to reenforce them rather than follow later in the year.

Solid Geometry and Plane Trigonometry or Mensuration.

In the study of solid geometry "great emphasis should be laid upon the student's real grasp of the conceptions, of the space figures, and of the significance of the theorems." To secure vivid mental pictures pupils should be required to construct models from cardboard, string and wire. During the entire course teachers should make generous use of illustrations, figures and drawings. Time may be saved by having the pupils demonstrate from a chart whose pages are about 2 ft. by 2½ ft., each page containing but one clear figure. By placing the chart before the class, the figures can be quickly changed for the purpose of demonstration, interpretation of figures or for review.

As many theorems are easily reducible to plane geometry the importance of having a clear conception of the relation between plane and solid geometry is quite apparent. Much emphasis should be laid upon the practical application of the subject. Many practical and original problems should be given throughout the course.

Unless there is a demand from the community for plane trigonometry it is doubtful if this form of mathematics should be attempted by high schools. In this subject there is motive for the study of logarithms and they should be given when needed. If there is no call for trigonometry then mensuration and some other arithmetical work may be studied to complete the year.

MATHEMATICAL BOOKS FOR TEACHERS.

Ball.—Short History of Mathematics. Macmillan Co.

Smith.—The Teaching of Elementary Mathematics. Macmillan Co.

Smith.—Teaching of Geometry. Macmillan Co.

Clifford.—Common Sense of the Exact Sciences. Appleton.

Langley.—Computations. Longmans.

Chrystal.—Algebra 2 vols. Macmillan Co.

McMurry.—Special Method in Arithmetic. Macmillan Co.

Evans.—Teaching of High School Mathematics.

Schultze.—Teaching of Mathematics. Macmillan Co.

Report of the National Committee of Fifteen on Geometry Syllabus. Bureau of Education.

School Science and Mathematics. Monthly.

Sykes.—A Source Book of Problems for Geometry. Allyn & Bacon.

Breckenridge, Mersereau & Moore.—Shop Problems in Mathematics. Ginn & Co.

Halsted.—Mensuration. Ginn & Co.

Estill.—Numerical Problems in Geometry. Longmans Green & Co.

Stevens.—Elementary Mensuration. Macmillan.

Young.—Foundations of Mathematics.

HISTORY.

The educative value of historical study properly gives it a place among the subjects to be taught in the high school. In Professor Horne's Philosophy of Education we read, "The human mind is trained to judge through the interpretation of the facts of history, supported by the memory and questioned by the imagination. It has a practical value in fitting youth for citizenship in a self-governing country. The practical element in the social environment is a great moral teacher of the pupils."

Perhaps the most generally accepted order in which to teach the different fields of history is that suggested by the Committee of Seven; Ancient, Mediaeval and Modern, English, and American. This is the logical order since it begins with the past and leads step by step to the present. Because of the simple forms of government and primitive life of the ancient peoples, it seems to be the natural order to present to the mind during the first year of the high school, while the complex institutional life of England and the intricate problems of America should be retained for the last years of the course. Success in teaching history will in a large measure, depend on a careful selection of history material. This makes it necessary to eliminate much that is found in our text books. Teachers must be willing to omit entirely or treat briefly, long accounts of wars, details of many battles, reports of dynasties, and unimportant facts of history. Attention should be given to the selection, arrangement and organization of the material.

In ancient history the chief emphasis should be put upon the study of the political, social and economic conditions and upon the origin, character and development of the ancient peoples, including their contribution to civilization. In mediaeval and modern history the elements in the civilization which have contributed to modern thought and some important systems of government in the leading countries of Europe should be carefully noted. Pupils should be required to find points wherein the governments studied are alike and wherein they show a marked contrast. In English history emphasis should be put upon the elements which have had a direct bearing on the history of our own country. In American history the aim should be to trace the important steps in our national development. Such a treatment will cover the industrial, political and social aspects of our nationality. "It is expected that good teachers in dealing with history throughout, and especially with American history, will constantly refer to the forms and functions of government with which the children are most familiar."

The Committee of Ten recommends that history should be taught through the entire course, for three periods a week. It is especially to be noted that each field of history should be studied through the

entire year. Time is an important factor, in tracing relations, fixing facts in the memory, and covering the amount of reading necessary for proper historical study. In regard to method it seems entirely proper to make a suggestion. A suitable text book on history should be used as a guide rather than as a source of all the information. The method should be in the main topical. Large topics or questions should be selected and these supported by significant detail. This will give a chance for wide reading, class discussion, comparison, grouping, assimilation and fixing important relations. Herein lies the chief value of teaching history. Proceed from cause to effect. Interpret the past in terms of the present. Correlate geography with the events and facts of history. The influence of physical features, such as rivers, coast waters and mountains, on the habits, warfare, and mode of living, should be made a large part of the historical work. Students should keep note books. These should contain records of discussion in class, outlines for readings and additional facts gained from the teacher and from collateral reading.

Great care should be exercised in taking notes as this sort of work well done will be of great value to the student in the future. Teachers are urged to keep in close touch with notebook work. Much written work at the blackboard, is of doubtful value. Frequently, a period of history is illuminated through the reading of an historical novel.

The Committee of Ten recommends an intensive study of a brief period in history. This suggests a good method for the study of American history in the fourth year. Too frequently the history of the United States consists of a general review of the same text and by the same methods employed in the elementary grades. The subject matter should be presented from a new point of view, large topics intensely studied, full of detail, and calling forth much reading, and discussion. The practice in many of our high schools of reviewing the history of the United States in two months for the sake of passing a teachers examination is to be deplored. This is nothing more than a cram which is very injurious to the mind. It is not absorption but assimilation that is educative.

To teach history properly requires an adequate equipment. Pupils should have access to more than one textbook. Every high school should provide a number of well-selected reference books on history, covering all the different fields, a good atlas, encyclopedia, maps, and source material.

Every teacher should be interested in the purchase of reference books for teachers. Such books contain the best that has been said on the subject, and furnish a guide along proper lines of teaching and study.

Books for teachers:

Bourne, Teaching of History and Civics. Longmans.
Report of the Committee of Seven. Macmillan.
Report of Committee of Ten. American Book Co.
Report of the Committee of Five. The Study of History in the Secondary Schools. Macmillan.
Barnes, "Studies in Historical Method." Heath.
Keattinge, Studies in the Teaching of History. Macmillan.
Mace, "Method in History." Ginn.
Vincent, Historical Research.
Hinsdale, How to Study and Teach History. Appleton.

HISTORY OUTLINES.*

First Year.

A. ORIENTAL HISTORY.

I. Egyptians.
II. Assyrians.
III. Hebrews.
IV. Phoenicians.
V. Persians.

Brief study of political, social and economic conditions, art, architecture and the work of archaeologists.

B. GRECIAN HISTORY.

I. Land. Drill upon geographical work, the spelling and the pronunciation of ancient names.
II. The People. Origin, character, typical organization, and institutions.
III. The rise of the Greek cities and the development of Greek political freedom. Colonization, sports, Athens, the defense of Greek freedom as seen in the Persian wars, the period of Athenian greatness.
IV. The decline of Greek freedom as shown by the conflict for leadership. Sparta, Thebes, Macedon.
V. The Graeco-Oriental world. The mingling of East and West under Alexander the Great.

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C. ROMAN HISTORY.

I. The land. Study of physical conditions and their relations to the development of the peoples inhabiting Italy. Comparison with geography of Greece.

II. Conditions existing in Rome at the beginning of the historical period.

(1) Extent of territory under Roman control.

(2) Organization as developed in the Regal period.

(3) Decline of kingship and development of Republican forms.

III. Rome as a Republic.

(1) Internal conflict. Steps in the struggle for the extension of class privileges.

(2) Expansion of Rome.

(a) The unification of Italy.

(b) The winning of the Mediterranean.

(3) The organization of conquered territory under Roman rule.

(4) Civil strife.

(a) New class difficulties.

(b) Attempts at peaceful reforms.

(c) Development of military monarchy.

IV. The Roman Empire. A topical survey of the institution of the Empire, the development of absolutism, the reorganization of the Empire under Diocletian and the adoption of Christianity under Constantine. The economic and social conditions of the Empire. Intellectual and architectural remains.

Second Year.

Mediaeval History.

A. TRANSITION.

I. The Teutonic Barbarians.

II. The Empire before the Barbarian invasion. Rapid review of development of the Roman Empire, relation to new forces without and within.

III. The Christians. The new force within the Empire destined to absorb and control it.

IV. The church. Its organization and political importance.

V. Monasticism. As a criticism of the worldliness of the church organization necessary to satisfy the demand for better opportunity to cultivate the ascetic ideal.

VI. The Era of Justinian. A period of reconstruction.

VII. The Byzantine Empire. The decline and fall of the Eastern Empire. The encroachments of the Saracens.

VIII. The Rise of Islam. The force which made Christendom conscious of its limitations and aided in bringing about the complete fusion of Roman and Teuton. The Mediaeval type.

IX. The Rise of the Franks. The power that checked Islam in the West.

X. The Holy Roman Empire under Charlemagne, the old Roman Empire, the Christian church, and the Teutonic Barbarian completely fused, the Madiaeval type closely established.

B. MEDIAEVAL EUROPE.

XI. Feudalism. The form or organization which of necessity arose to control political, social, military, and economic conditions in an age of confusion.

XII. France. Development through its struggle with feudalism, the formation of national unity.

XIII. Germany. The way in which feudalism and the Italian complication effected the development of monarchy in Germany.

XIV. Conflict between Empire and Papacy. The relation of emperors to popes and popes to emperors.

XV. The Mediaeval church at the height of its temporal power. The unifying force of the Middle Ages, its organization, doctrine, extent of its control.

XVI. The Crusades. As illustrative of the Mediaeval spirit, importance from economic standpoint.

XVII. Mediaeval learning. Review of intellectual conditions from Augustan Age to the Renaissance.

XVIII. The Hundred Years War. Its influence upon the development of the English and French Monarchies.

XIX. The Italian cities and the Renaissance. Wealthy, independent cities as centers of progress in art and letters.

XX. Rise of the Hapsburgs and the ascendency of Spain. The stronghold of Catholic faith and papal support.

XXI. The Protestant revolt in Germany. As a revolt against authority.

XXII. The Catholic Reformation and the Rise of the Dutch Republic. The determination for religious freedom leads to political independence.

XXIII. The Thirty Years' War. The last great conflict caused by difference between Catholics and Protestants. The growing prevalence of political rather than religious motives.

C. MODERN EUROPE.

XXIV. The ascendancy of France under Louis XIV. France as a type of Absolutism.

XXV. Rise of Russia and Prussia. Organization and consolidation of Eastern Europe.

XXVI. The French Revolution; the end of the "old order."

XXVII. Europe and Napoleon; attempts to establish again the Empire under Napoleon.

XXVIII. The unification of Germany; unity through confederation under Prussian leadership.

Third Year.

ENGLISH HISTORY.

I. Geography of Great Britain and Ireland.

II. Infusion of social elements. To 1154.

(1) Pre-Roman Britain. Records; degree of civilization attained; survivals.

(2) Roman Britain. 43-410 A. D. Conquest; Romanizing of the province; decay of Roman Britain.

(3) Teutonic Britain. To 1066. Conquest and settlement; introduction of Christianity and development of ecclesiastical unity; development of political unity prior to Alfred; first period of Danish conquests; Wessex and Alfred the Great; political unity in the 10th century; English civilization in the 10th century; second period of Danish conquest; restoration of the English.

(4) Norman Britain—1066-1154. The Norman conquest of England; means by which William established his rule; effects of the conquest on language, architecture, feudalism, government, the church; civil war.

III. Foundation of the nation, 1154-1216. Extension of the English possessions; reorganization of the government and the possession of the judicial system; conquest of Ireland; England and the Crusades; loss of the French possessions; conflict with the church; Magna Carta; fusion of social elements.

IV. Formation of a united English people, 1216-1327. Struggle against arbitrary rule, Henry III; constitutional growth under Edward I; conquest of Wales; attempted conquest of Scotland; struggle against arbitrary rule, and its constitutional results, Edward II; social and economic conditions of the 13th century.

V. A period of foreign war and internal strife, 1327-1485. The Hundred Years War; the War of the Roses; growth of parliamentary rule; rise of the "New Monarchy;" social and economic change of the 14th and 15th centuries.

VI. The Tudor despotism, 1485-1603. The Tudor despotism established; the Protestant revolt; the Catholic reaction; the religious settlement under Elizabeth; Protestant revolt in Scotland; Elizabeth and Mary Stuart; the Spanish war; discoveries and explorations; growth of English commerce; development of manufactures and the shifting of manufacturing centers, enclosures; pauperism; Ireland; literature; the "new learning;" the "Elizabethan Age."

VII. Struggle against absolute monarchy, 1603-1688. Preparation for the conflict under James I and Charles I; the Civil War; the Commonwealth and Protectorate; the restoration; revolution of 1688, colonization.

VIII. Foundations of the British Empire, 1689-1815. The struggle for Empire—the Second Hundred Years' War; constitutional changes and the rise of the early party government; union with Scotland and Ireland; the Evangelical movement; Industrial Revolution; England and the French Revolution; literature.

IX. A period of democracy and reform, 1815-1909. Social, political, religious, economic reforms in England; Ireland and reform; growth of democracy; the eastern question; expansion of the British Empire and plans for imperial federation; party government perfected; the Boer War; literature.

Fourth Year.

*UNITED STATES HISTORY.

I. Formation of the nation, 1492-1763.

(I) Geography of the United States.

(II) Discovery.

(III) Colonization of America.

1. Colonization in the 16th century.
2. English colonization, 1607-1732.
   - (1) Southern colonies.
   - (2) New England colonies.
   - (3) Middle colonies.

(IV) Conflict between France and England for supremacy.

1. 1689-1763; conditions leading to conflict.
2. The Intercolonial Wars and their results, 1689-1763.

(V) Economic, social, and political condition of the English colonies in 1760.

II. A nation in the transit, 1763-1789.
(I) Separation of the English colonies from the mother country.
(II) Formation of the union.
(1) Critical period, 1783-1789.
a. The Confederation.
b. The Constitution.

III. The development of nationality, 1789-1860.
(I) Period of Federalist supremacy, 1789-1801.
(II) Period of Republican supremacy, 1801-1815.
(III) Period of reorganization, 1815-1829.
(IV) Democracy in the ascendancy, 1829-1845.
(V) Slavery question uppermost, 1854-1860.
1. Extension of territory; settlement of Oregon question; Mexican war.
2. Extension of slavery.

IV. The nation tested, 1860-1865.
(1) Secession. Secession in the cotton states; policy of Buchanan; attempts at compromise; formation of Southern Confederacy; policy of Lincoln.
(II) The Civil War, 1861-1865. Resources of contestants, attitude of foreign powers; study of strategic points; military events; emancipation policy; cost of war; constitution during the war.

V. Expansion of the nation, 1865-1909.
(I) Economic and political reconstruction of the South; condition at the close of the war; presidential and congressional reconstruction; the "New South," and the race problem.
(II) Some of the leading social and political problems since 1865.

VI. A brief study of some of the more important facts of civil government.

CIVICS.

Where no civics is taught in the elementary school it is perhaps best to place this subject in the first year of the high school. A half-unit course at least should be devoted to this field. The approach to

the subject should be made through the local unit as the township, borough, or city and county. This should include something of its history, boundary, officers, their election and their duties.

The work should be made as concrete as possible. Among the important topics dealing with concrete material are the public school system, especially with respect to its history, maintenance, control and relation to the state; various activities of the township such as road making and maintenance, looking after the poor, maintaining order, etc.

The study of the borough should include such topics as borough charter, street paving and street cleaning, street lighting, sewage disposal, protection against fire, care of public health, public parks, and police protection. A study of the county should include the county officials and their duties, the court house as a place for keeping permanent records, the work of the courts, composition, selection and duties of the grand jury, of the petit jury, bridge building and road construction, fixing and collecting taxes.

It will add interest to the subject to invite persons who have served as county or state officials to address the pupils on different questions of government. If possible, have the class spend some time in the court house and city hall when practical visiting the different offices and possibly a trial in the court-room and a session of the city council.

The facts and experiences gained in the study of local questions in civics will furnish an excellent preparation for the study of the government of the State and of the nation. The money appropriated by the state for the support of the local schools and the qualifications for voting show the pupils ways in which the state government touches the individual citizens. All money in circulation and the post office with its parcel post, postal savings, and money order departments should introduce the pupils to some of the very common functions of the national government. The aim of the whole course should be to make the pupils feel the dignity of citizenship and to develop in them a real sense of responsiveness to the duties of the citizen.

In the Preliminary Statements on Reorganization of Secondary Education the committee on social studies proposes to outline the five following units of social studies:—*

"(1) Community civics and survey of vocations.
(2) European history to 1600 or 1700 (including English and Colonial American History).
(3) European history since 1600 or 1700 (including contemporary civilization).
(4) United States history since 1760 (including current events).
(5) Economics and civic theory and practice."

*The term "social studies" is used to include history, civics and economics.

"Community civics aims to acquaint pupils with the civic condition of their own community. Pupils visit in person and study at close range the vital elements of their city, village or rural area. Personal visitation and first-hand information is a distinctive feature of the course. It insures the reality and simplicity so necessary to a vital knowledge of social forces. Finally, knowledge of the neighborhood will show the pupil how an effective education will make him a productive citizen."

SURVEY OF VOCATIONS.

The second part of the first unit is a survey of vocations. The aim of this survey is to study several of the common vocations. "It is thought that such a course besides being intrinsically interesting to the pupils actually gives them greater respect for all kinds of honorable work helps them later to choose more wisely their life work, convinces them of the absolute necessity for a thorough preparation before entering any vocation and helps to the end of the high school many who otherwise would have dropped out early in the race."

FIRST YEAR SCIENCE.

The character and efficiency of the courses in science in the high school will depend largely upon the kind of science offered in the first year and upon the manner in which this course is presented.

The main objects of the first year of this course should be to cultivate the scientific habit, to create a taste for and an interest in scientific investigation, to teach the pupil to observe the natural phenomena about him, and to interpret accurately their causes and effects.

The best results can be accomplished with beginners by requiring them to carefully observe from a scientific standpoint those things with which they, by their association with nature, are already more or less familiar. Those lines of investigation and the experiments which deal with the phemonena of the earth, its origin and general parts, will furnish a natural and logical method to introduce the general subject of secondary science.

The year's work should deal with the earth as a whole, the interpretation of the phemonena of land, water and atmosphere, accompanied by numerous experiments of a physical, chemical and biological nature. Freehand drawings of natural objects observed during field excursions should form a very important part of the work. Lantern slides, pictures, general maps, weather maps, and geographical books will greatly aid the work.

This course should continue for a period of not less than twenty-four weeks, of four recitations per week. When short school terms prevent giving this amount of time to the subject, the lesser important topics and experiments should be omitted from the suggestive outlines. In schools which have the longer term, at least forty experiments of the following list should be performed.

Each pupil should be required to keep a note book which shall contain in neat arrangement, the results of his observations, experiments, and his drawings. The note books should be written at the time the exercise is performed and should be available for inspection by representatives of the Department.

All pupils taking this course should be required to perform individually at least twenty-five exercises, selected from the accompanying list.

OUTLINE.

I. The earth as a whole.
  A. Its relation to the sun and universe.
  B. Its relation to other planets. Nebular hypothesis.
  C. Its shape, six proofs. Origin of shape.
  D. Size.
    1. Compare with sun, moon and the planets.
    2. How determined.
  E. Motions of the earth.
    1. Rotation and effects. Distance from sun, seasons.
    2. Revolution and effects. Equinox, Solstice, Inclination of Axis.
  F. Location upon its surface.
    1. Determined by latitude and longitude.
    2. Lines on the earth used in longitude.
    3. Lines located by earth's inclination.
    4. Maps,—Projection, contour lines, colors.
  G. Magnetism; compass and its variations.

II. The Atmosphere.
  A. Its height and its weight; isobars, pressure.
  B. Composition (A mixture).
    1. Nature and source or occurrence and use of each constituent.
    2. Dust and its effects.
  C. Heat of the atmosphere.
    1. The thermometer. Its principle.
    2. Isothermal lines.
    3. What are the factors influencing temperature.
    4. Sources of heat.
    5. Effects on land and water.

D. Moisture.
   1. Evaporation—cause—variation—when will it cease?
   2. Relative and absolute humidity: The hygrometer; the dew point.
   3. Condensation,—cause and forms.

E. Circulation.
   1. Cause of wind and its benefits.
   2. Cyclones, tornadoes, cloud bursts, and their origin.
   3. Periodic and variable winds.
   4. Climate:
      a. Causes and controlling agents,
      b. Weather and weather maps,
      c. Meterology,
      f. Uses of the atmosphere,—physical and chemical. Forecasting.

III. The Land.
   A. Building up forces. Tearing down forces.
   B. Interior of the earth.
   C. Movements of the earth's crust.
   D. Original condition of the earth. Prehistoric age.
   E. Mountains, plateaus, plains.
      1. How formed.
      2. Influence on people, climate and industries.
      3. Influence on other living things.
   F. Volcanoes.
      1. Distribution; 2. Theories; 3. Phenomena.
   G. Earthquakes.
      1. Theories of; 2. Historic earthquakes; 3. Instruments.
   H. Hot springs and geysers.
   I. Rocks—kinds and classification.
   J. Soils—kinds and values.
   K. Rivers.
      1. Erosion.
      2. Sedimentation.
   L. Lakes.
      1. Relation to rivers.
      2. Salt lakes and their causes.
   M. Glaciers, past and present.
   N. Forces causing changes in land now.
   O. Life forms and their distribution.

IV. The Ocean.
   A. Depth, density, temperature, and composition.
   B. Movements.
      1. Waves, cause and effects.
      2. Currents, cause and effects.

C. Erosion and deposit.
D. Ocean floor.
E. Life in the ocean.

V. Other Waters.
A. Evaporation, condensation.
B. Wells, springs, underground streams,
1. Kinds, effects, and uses.

The following is a suggestive outline for each of three field excursions:

A. Observation of soil deposit.
1. Shape of deposit.
2. Materials composing it.
3. Layers.
4. Marks or scratches.
5. Kinds of rock to which the soil belongs.
6. Varieties of soils shown.
7. Strange rocks or soils.
8. Source of the soil.
9. Agents of erosion.
10. How was the material transported here.
11. Character and value of the soil.

B. Observation of rock deposit.
1. Formation.
2. Thickness.
3. Dip.
4. Classes.
5. Cleavage.
6. Layers.
7. General characteristics.
8. Weathering, kinds and rate.
9. Talus accumulation.
10. What becomes of eroded material.

C. Observation of a flood plain.
1. Location.
2. Shape.
3. Peculiarities.
4. Meandering stream.
5. Terraces.
6. Strange rocks and fossils.
7. Character of soil.
8. Farms and gardens.
9. Villages, location, size, etc.
10. Character of boundaries.
11. Wells.
12. Drainage.

Outline for the study of the Ocean.

1. Area.
2. Distribution, oceans and size.
3. Ocean floor.
   a. Topography of bottom.
   b. Volcanic cone.
   c. Steep slope.
   d. Valley like depressions.
   e. Great Ridges.
4. Materials, clay, gravel, sand, (ooze), coral, organic sediment.
5. Depth and pressure.
6. Ocean waters,—composition and temperature.
7. Ocean movements,—causes, ocean waves, currents, historic significance.
8. Winds.
9. Anti Trade Winds.
10. Ocean Life.
11. Ocean Traffic.

Laboratory and Field Exercises.

1. Construct a figure showing the relative position of the sun, earth and other planets.
2. Show causes of the phases of the moon.
3. Drawing to show causes of several kinds of eclipses.
4. Drawing to show shape of the earth, and its size compared with the moon and planets.
5. Methods of determining the size of the earth.
6. Drawing to show position of the earth at the solstices and equinoxes.
7. Drawing to show how solar, lunar and siderial day are determined.
8. Drawing to show method of computing the distance of the earth from the sun.
9. Dark room experiments—globes and candles.
10. Determine the pupil's latitude.
11. Sketch continents in a projection map of latitude and longitude lines.
12. Drawing to show kinds of lines of measurement used on the earth.
13. Interpret a contour map.
14. Make a contour map from data.
15. Determine altitude by a barometer.
16. Experiments with bar and horseshoe magnets.
17. Magnetism produced by an electric current.
18. Plot magnetic lines of force.

19. A simple physical change of matter.
20. A simple chemical change of matter.
21. Examine several forms of carbon. Note occurrence, characteristics and uses.
22. Demonstrate diffusion of gases.
23. Demonstrate diffusion of liquids.
24. Generate oxygen—simple experiments with oxygen to show combustion, rusting, formation of oxides.
25. Generate nitrogen—simple experiments with nitrogen. Study a nitrate.
26. A simple test for carbon dioxide.
27. Effect on plant placed in jar of carbon dioxide.
28. Effect on plant placed in jar of oxygen.
29. Test the gas in each jar after several hours.
30. Determine dew point.
31. Study isobaric charts of the world.
32. Demonstrate composition of air experimentally.
33. Plot pressure curves.
34. Study several kinds of thermometers.
35. Determine boiling point and freezing point.
36. Plot temperature curves.
37. Study isothermal charts.
38. Account for difference in isothermal charts for different months of the year.
39. Experiment showing evaporation and condensation of water.
40. Experiment showing capillarity.
41. Study the hydrometer.
42. Keep daily records for a week or more of temperature, pressure, wind direction and speed.
43. Study general wind directions from weather maps.
44. Forecast weather from data.
45. Map showing causes of climate.
46. Study topography in the vicinity of the school.
47. Study six minerals, note their characteristics.
48. Study quartz, feldspar, mica and other rock bases.
49. List the characteristic rock near the school.
50. Note the characteristics of a few common metals.
51. Drawing to show cross section of an active volcano.
52. Drawing to show a geyser in action.
53. Study properties of a common acid, base salt.
54. Experiment: Action of acid on marble.
55. Action of water on soluble salts.
56. Effect of running water on rocks and soils.
57. Expanding force of ice.
58. Cross sectional drawing showing glacial creep.

59. Study common types of bacteria, microscopically.
60. Study spread of disease by flies, rats, etc.
61. Study one common type of each of the several classes of plants in the vicinity.
62. Note location, root, branches, leaves, stem, flowers, and fruit.
63. Study a common type of each of the several classes of animals in the vicinity.
64. Note mouth, alimentary canal, respiration, circulation, sketch means of locomotion.
65. Study distribution of grains and fruit with respect to climate.
66. Study food stuffs in common foods.
67. Collect seeds. Experiment in germination.
68. Note forest reserves and their location.
69. Experiment wave motions, spiral transverse and longitudinal.
70. Drawing, cross sectional, to show side view of advancing series of waves.
71. Make a collection of plant and animal fossils.
72. Study river of a young class.
73. Study river of the old class.
74. Study a plain.
75. Study a plateau.
76. Study animal life with respect to climate.

EQUIPMENT.

The following maps may be secured from bureau of the United States Geological Survey, Washington, D. C.

1. A plain—Fargo, N. D.
2. A Mountain Range—Harrisburg, Pa.
3. A Young River—Dublin, O.
4. An old River—Caldwell, Kansas.
5. Dissected Mountain—Mt. Marcey.
6. Flood plain—St. Louis, Mo.
7. Wind deposits—Kingsley, Kansas.
8. Moraines—Brooklyn, N. Y.
9. Drumlin, Sun Prairie, Wis.

General coast and sailing chartes of the Atlantic and Pacific Oceans can be secured from the United States Coast and Geodetic Survey for fifty cents each. Tide tables can be secured from the same source for twenty-five cents each. Secure weather maps from the United States Weather Bureau, Philadelphia or Pittsburgh.

For Experiments.

1 mineral collection,	$2 50
1 map mounting set,	1 65
Outline maps per pad,	25

1	Globe, 12 inch,	6 00
	Best physical wall maps, each,	4 50
1	Maximum and minmum thermometer,	3 00
1	Aneroid barometer,	6 00
1	Rain guage,	2 75
1	Balance,	5 00
1	College bench lantern,	27 00
	Slides each,	40
	Colored pencils, per box,	06
	Drawing pencils, per dozen,	1 00
1	Compass,	1 00
1	Bar magnet, 6 inch,	50
1	Solenoid magnet,	1 70
1	Tripod,	45
	Aquarium—glass,	4 00
1	Bunson Burner,	30
	Glassware for oxygen generator,	20
	Rubber tubing per foot,	08
	Dry cells, each,	25
	Rubber stoppers—depend on size,	
1	Funnel,	20
4	oz. Yellow phosphorous,	45
1	Deflagrating spoon,	15
	Flasks according to size,	10-50
1	Standard F. & C. thermometer,	1 50
1	Hydrometer—wet and dry bulb,	3 50
1	Wind guage,	20 00
1	Hand air pump,	4 00
1	Bell jar,	2 50
	Hydrochloric acid per pound,	10
	Nitric acid, per pound,	10
	Sulphuric acid, per pound,	05
	Sodium Hydroxide, per pound,	12
	Potassium Hydroxide, per pound,	50
	Roll Sulphur, sufficient,	02
1	Microscope—high power,	30 00
	Iron filings, per pound,	10

The foregoing prices are submitted for the purpose of making estimates only. Much equipment can be made by the pupils or secured from the chemical and physical laboratory. A satisfactory list of exercises may be selected from the foregoing by omitting those which require expensive apparatus. In small schools, one set of equipment for each exercise or series of similar exercises will be sufficient. Several different exercises may be assigned to pupils work-

ing in couples. In this manner the total minimum cost of the equipment for small schools should not exceed twenty-five dollars for each group of six pupils.

The list of laboratory exercises should first be selected. Only such apparatus and supplies as such a list requires should be purchased. When possible, sufficient apparatus should be supplied to enable groups of pupils to work in couples on the same experiment.

Reference Books.

Davis—Meterology—Ginn & Co.
Dodge—Reader in Physical Geography—Longmans, Green & Co.
Tarr—New Physical Geography—The Macmillan Co.
Russell—Rivers of North America—Putman.
Shaler—Nature and Man in America—Scribners.
Herrington—About the Weather—Appleton.
Russell—Lakes of North America—Ginn & Co.

BOTANY.

In the study of this subject, high school pupils frequently enter for the first time the "fairy land of science." Every school is surrounded with a wealth of material and it is the privilege of the earnest teacher to remove the seals from the book of nature and create enthusiastic readers for life. In no other subject is the call for spirited leadership more imperative. It is better to omit the course entirely than to entrust it to a teacher who has no interest in the subject except for to cover a prescribed number of pages in a text book in a given time.

Schools that give but a seven months' term ought to spend the entire time on this subject rather than to divide the time between zoology and botany. Where the term is nine months long, it is entirely possible to consider some important topics in both branches of natural history. The determination of these topics is the most difficult task of the teacher.

Dr. Hodge, of Clark University, stated in his lecture before the high school Department at Harrisburg that "In preparation for active citizenship let the biology of the high school centre about the life, interests, and problems of the town or city, the state or nation. Do the highest interests of the community require that its educated citizens know this or that, is the question which should determine whether a topic be admitted to the high school course." "In the college, the student enters the world of pure science. Here for the first

time, not the need of the child or the community, but the logical development of the subject matter must dominate. The nature study point of view is to teach the child. The scientific point of view is to teach the subject."

With this great purpose before him, the teacher must choose from a great variety of material. Laboratory work with a compound microscope as an aid is an important part of the course. Carefully kept note-books illustrated by drawings of many things studied will give a valuable training. A study of native trees, economic plants such as cotton or rice, weeds, parasitic plants, wild flowers, garden flowers, or ferns may be emphasized to add interest and variety to the regular work.

One of the main objects of this course is to teach the pupil to appreciate the beauties of nature and to show the harmony with which all laws and forces act to produce the many variations in plant life. Care should be taken to not make the course too technical, and the extensive use of scientific terms should be avoided. Pupils should be encouraged to make collection of such plants, leaves and roots as they have observed during field excursions.

Each pupil should have an herbarium which should contain at least fifty mounted specimens. The principles of plant analysis should be taught in connection with the collection and mounting of plants. The number of specimens analyzed need not exceed that which will give the pupil a good understanding of the subject. Twenty of the laboratory exercises should be properly completed. All note books shall be available for inspection by members of the Department.

OUTLINE.

1. General observations of fall flowers.
2. Collection and mounting of fall flowers.
3. The study of the plant as a whole.
4. Seeds and seedlings—four classes, food content, germination.
5. Seed distribution—methods and purpose.
6. The plant.
   (a) Root, kinds and uses, function. (b) Stem, kinds and position. (c) Leaves, kinds, arrangement, position, light, relations. (d) Flower, structure. (e) Fruit, classes, structure.
7. Study of several flowers.
   (a) Notice resemblances. (b) Pollination, wind, insect, gravity.
8. Microscopic study of cells.
9. Stems and buds. Arrangement, kinds and uses.
   (a) Exogens. (b) Endogens.

10. Study trees.
    (a) Recognition by flower and fruit.
    (b) Recognition by bark and cross section.
    (c) Recognition of lumber.
    (d) Uses. (e) Care of trees. (f) Spraying. (g) Tree planting.
11. Analysis of flowers.
    (a) Preparation of herbarium. (b) Field Excursions.
12. Flower plants.
    (a) Algae. (b) Fungi. (c) Moss. (d) Ferns. (e) Gymnosperms. (f) Angiosperms.
13. Plant societies—eight classes.
14. Insectivorous plants.
15. Botany and Agriculture.
    (a) How plants drink. (b) How plants breathe. (c) How fluids move in root and stem. (d) Chlorophyll and food making. (e) Storage of food. (f) How plants grow. (g) Plant protection and adaptation. (h) Effect of heat, light, moisture, contact and gravity.
16. Forestry.
17. Plant tree seeds. Practice in grafting.
18. Bulb culture.

If the course in botany is continued through the entire year, the following order of study will be found helpful.

1. Fall flowers—general observations—collection of.
2. Leaves.
3. Fruits—dry and fleshy.
4. Roots.
5. Stems, cross and vertical sections.
6. Buds.
7. Seeds—Germination.
    (a) Testing of soils. (b) Selection of seeds. (c) Testing fertilizers. (d) Capillarity in soils.
8. General observations.
    (a) Movement of sap. (b) How plants breathe. (c) Removal of chlorophyll. (d) Storage of food. (e) Effects of heat, light, and varying degrees of moisture.
9. Study of trees.
10. Study of lower plants.
11. Analysis of flowers.

LABORATORY AND FIELD EXERCISES.

1. Test effect on leaves by excluding light.
2. Test effect on leaves by excluding air.
3. Drawings of several kinds of leaves.

4. Examination of stomata.
5. Cross and vertical section drawings of fleshy fruits.
6. Irregular modes of transportation—India rubber plant.
7. Amount of water lost by transpiration.
8. Experiment showing withering and recovery.
9. Examine stems for leaf scars.
10. Test for sugar in leaves. Fehling's solution.
11. Collection of dry fruits.
12. Arrange under separate heads as beneficial seeds, injurious seeds, cereals, etc.
13. Cross and vertical section drawings of roots.
14. Examination of root cap.
15. Examination of root hairs.
16. Tabulate rate of growth of roots.
17. Principle of osmosis.
18. Rise of liquids in roots—demonstration.
19. Where does increase in length take place in roots.
20. How temperature effects absorption of water by roots.
21. Make collection of different kinds of stems of the community.
22. Study pruning.
23. Make collection of stems to show modes of branching.
24. Cross and vertical sections of stems. Polish the surfaces.
25. Show method of passage of water from stem to leaf.
26. Show how light changes the position of stems and leaves.
27. Test the onion for food contents.
28. Experiment to show rise of water in stems.
29. Study "grain" of wood.
30. Make quarter sawed sections of wood.
31. Study buds of alternate leaved plants.
32. Study buds of opposite leaved plants.
33. Study scales of different buds.
34. Study vernation of oak, cherry, sycamore, poplar, dock.
35. Study dormant buds.
36. Effect of heat on germination.
37. Effect of excessive, or absence of, water on germination.
38. Effect of absence of air on germination.
39. Effect of removing cotyledons from seedling.
40. Show if size of seed governs germination and growth.
41. Test seeds for starch.
42. Observe growth of pollen tubes.
43. Observe unfolding of bud.
44. Test germination and growth of seedlings with different soils.
45. Test germination and growth of seedlings with different amounts of fertilizer.

46. Test germination and growth of seedlings with different kinds f fertilizers.
47. Germination of yeast.
48. Bacteria cultures made from common sources.
49. Microscopic examination of moulds, rusts, spyrogyra, etc.
50. Set out graft—modes of grafting and budding.
51. Collect specimens of bark of the different trees nearby.
52. Exercises in spraying.
53. Collect fossil remains of early vegetation.
54. Plant analysis.
55. Collection of weeds and study methods of destroying them.
56. Transplanting.
57. Propagation by adventitious roots.

EQUIPMENT.

Much of the equipment provided for other science courses may e used for the work in botany, thus avoiding the purchase of addi- ional parts. However, the equipping of the laboratory separately s urged. In schools where the resources are limited, only the more ssential apparatus should be purchased. Additions can be made nnually with little difficulty.

The following equipment is quite sufficient to equip a laboratory for en pupils working at one time:

1	table 8 ft. long, 3½ ft. wide, 3 ft. high,....	$10 00
1	compound microscope, ...	30 00
1	balance with weights, ...	4 25
4	pairs scissors, ...	3 00
4	straight forceps, ...	1 50
4	curved points forceps, ...	1 50
1	collecting case, ...	1 50
1	plant press—pupils make.	
10	dissecting needles, ...	40
4	hand lenses, ...	1 40
4	scapels, ...	1 00
10	flat plates, ...	50
2	dissecting razors, ...	2 00
12	plant pots, ...	50
2	oz. cover glasses, ...	1 60
2	pipettes, ...	08
1	pint each testing solutions, per pint,.....	25
2	trowels, ...	20
1	thermometer, ...	1 00

Cases for mounting seeds, etc., pupils make.

The foregoing list is only intended to aid in making the proper selection of materials. The list of laboratory exercises should be made after which the required equipment can be selected.

REFERENCE BOOKS.

Ganong—The Teaching Botanist—Macmillan.
Coulter—Plant Relations—Appleton.
Coulter—Plant Structure—Appleton.
Setchell—Laboratory Practice for Beginners—Macmillan.
Bulletins issued by State College, Department of Agriculture.
Bulletins issued by Pennsylvania, Department of Agriculture.
Bulletins issued by United States Department of Agriculture.
Atkinson—Mushrooms—Holt.
Bailey—Plant Breeding—Macmillan.
Barnes—Outlines of Plant Life—Holt.
Bergen & Davis—Principles of Botany—Ginn.
Lipman—Bacteria in Relation to Country Life—Macmillan.
Pinchot—Primer of Forestry, Washington, D. C.
Schimper—Plant Geography—Oxford Press.

ZOOLOGY.

There is more opposition among pupils and patrons to the study of zoology than to any other science found in the curriculum of the high school. This is doubtless due to poor teaching and erroneous notions about the subject itself. If the same test be applied to topics in zoology that is suggested in botany much of this opposition may be overcome. Unless proper selection of material and topics is made, it would be best to omit the subject from the course. Where a choice must be made between zoology and botany or zoology and agriculture, the omission of zoology is recommended. All pupils have a natural and healthy interest in living things and the work in zoology should seize upon this trait and so direct it, that the course may be very profitable. The material is at hand in Pennsylvania for work in each of the great groups of animals.

If some insect as the fly, or the craw fish, the frog, the sparrow and some common animal as the cat, are studied as type forms, a broad course is offered.

The economic questions involved in the extermination of the native birds, and the great increase in the English sparrows, should receive attention. The destructive animals and means of destroying them, either natural or scientific, should be studied. In fact the

whole course could well be devoted to the study of the animal problems of the farm. The grasshopper, the coddling moth, the army worm, the cut worm, the peach borer, the caterpillar, the rose bug, the potato bug, and the various scales are destroying annually more property than was ever threatened by an invading army. If the course in zoology will aid in the solution of these problems, the above mentioned opposition will soon disappear.

The main objects of the course in zoology should be to train the pupil to make careful observations and correctly record them, to acquaint the pupil with the common animals in his neighborhood; to make a careful study of their habits in order to determine whether they are beneficial or harmful to man; to pursue such laboratory work as will acquaint the pupil with the more common morphological, ecological and physiological terms, to show the relation between plants and animals, and to teach the meaning of sanitation. A special study of birds or insects or some other class of animals is sometimes found to be very profitable and interesting. Some pupils of every class in zoology can doubtless be encouraged to make a special study of some distinct order of life to the profit of the whole class. Pupils should be encouraged to make a collection of the smaller forms of the lower orders of animals. Frequent field excursions are suggested in order to study the life habits, characteristics, homes, etc., of the more common animals. The collections of specimens may be grouped and mounted under such heads as beneficial or harmful, carnivorous or herbivorous, essential or injurious to the life of other animals or plants, moths, etc.

A carefully prepared note book should be kept by each pupil, and it should be available for inspection at all times. It is not expected that the pupils will have time to make extensive note book records. Whatever work is attempted, however, should be accurately and neatly done. Care should be taken not to make the work too technical. At least fifteen of the field and laboratory exercises should be completed during the year.

OUTLINE.

1. Study the animals of the vicinity in a general way.
2. Note the character of reproduction and growth, external and internal structure.
3. Note the part that animals play in the commercial life.
4. How animals serve man.
5. Study life and habits of animals in captivity.
6. Read articles on mental traits and intelligence of animals.

7. Life history.
   (a) Type form as the mosquito, silk worm.
   (b) Type form as the toad.
   (c) Type form as the bird.
8. General classes:
   (a) Protozoa. (b) Hydra. (c) Sponges. (d) Star fishes. (e) Worms. (f) Crustaceans. (g) Insects. (h) Spiders. (i) Mollusks. (j) Fishes. (k) Reptiles. (l) Amphibians. (m) Birds. (n) Mammals.
9. Brief biography and works of noted scientists.

The following outline is suggestive for the study of the life of any animal:

A. Breeding habits.
   (1) Age. (2) Number of offspring. (3) Care of young. (4) Kind of nest. (5) Where located. (6) Alternation of generations.

B. General habits.
   (1) Wandering. (2) How far per day. (3) Hibernate. (4) Mimicry.

C. Food.
   (1) Kinds. (2) When eaten. (3) Amount eaten. (4) Feeding habits.

D. Mental traits.
   (1) Cunning. (2) Teachability. (3) As used in securing food. (4) Used in finding way home.

E. Enemies.
   (1) Kinds. (2) Number.

F. Environment.
   (1) Effects of cold or heat. (2) Adaptation. (3) Body markings. (4) Useful or injurious.

The following is a suggestive outline for the study of invertebrates:

1. Structure.
2. Circulation.
3. Digestion.
4. Nervous system.
5. Development.
6. Locomotion.

Outline for vertebrates:

1. Skeleton.
2. Organs of digestion.
3. Circulation.
4. Nervous system.
5. Breathing.
6. Integumentary system.
7. Muscular system.
8. Locomotion.
9. Excretory system.
10. Reproduction.

LABORATORY AND FIELD EXERCISES.

1. Field excursions should be planned according to the foregoing suggestions.
2. Pupils should learn to recognize the common animals of any order which they have studied.
3. Note the general plan of internal structure of a type animal in each of the foregoing general classes.
4. Examine tissue first with the naked eye, then with the microscope.
5. Study only the general features of reproduction.
6. Microscopic examination of Amoeba.

   Note.—Layers of body, granular movements, blunt projections, food getting, fission.
7. Microscopic examination of Paramoecium.

   Note.—Movements, structure, gullet, layers of body, oval sacks.
8. Microscopic examination of Bell Animalcule.

   Note.—Location, general appearance, movements, cilia, disc, protoplasm, nucleus.
9. Examination of Hydra.

   Note.—Appearance, movement, structure.
10. Examination of Planarium.
11. Examine skeleton of star fish.
12. Examination of earth-worm.

    Note.—Habitat, movement, external features, internal features.
13. Examine as above, Cyclops, water flea.
14. Examine as above, Crab.
15. Examine as above, Centipede.
16. Examine as above, Spider.
17. Examine as above, Snail.
18. Examine as above, Common Fish.
19. Examine as above, Frog or Toad.
20. Examine as above, Sparrow.
21. Comparison of general life processes in plants and animals.

EQUIPMENT.

The following list of equipment and prices are only suggestive and are intended to aid in the selection of proper materials. Much of the equipment can be used in connection with the work in other science courses, which will materially reduce the cost of equipment for the course in zoology. However, the equipment should be provided separately for the several science courses. The list of exercises for the course should first be selected, and the apparatus and supplies purchased accordingly. The list is sufficient for ten pupils working alternate experiments, in couples.

1 Bunsen burner,	$ 30
½ gallon alcohol,	1 50

1 clamp,	50
1 oz. Canada Balsam,	12
6 battery jars, 6 x 8,	1 50
½ lb. chloroform,	23
3 evaporating dishes,	50
4 oz. ether,	32
1 apparatus stand,	45
1 pint wood alcohol,	20
3 beakers, 250 c.c.,	25
½ lb. carbon bisulphid,	08
1 florence flask, 500 c.c.,	25
½ lb. calcium hydroxide,	25
1 pkg. filter paper,	07
½ lb. Fehling's solution,	20
1 six-inch funnel,	15
2 lbs. formalin,	30
3 dissecting forceps,	50
½ oz. iodine,	10
1 insect case,	1 00
2 books litmus paper,	06
3 ignition tubes,	15
½ lb. sulphur,	05
1 paper pins,	05
½ lb. potassium chlorate,	09
1 box gummed labels,	04
1 oz. xylol,	05
1 compound microscope,	30 00
½ lb. nitric acid,	09
3 hand lenses,	1 00
1 oz. pepsin,	15
3 black bottom pans,	1 60
2 lbs. paraffine,	20
3 white lined pans,	90
¼ lb. phosphorus,	20
6 preserving jars, 500 c.c.,	45
1 oz. pancreatin,	20
3 pairs scissors, sharp points,	50
1 jar vaseline,	05
1 table, 9 ft. long, 3½ ft. wide, 3 ft. high,	10 00
1 test tube holder,	25
3 scapels,	70
50 test tubes,	1 00
1 chemical thermometer,	35
3 test tube brushes,	15

REFERENCE BOOKS.

Hodge, Nature Study and Life. Ginn & Co.
Lubbock, Ants, Bees and Wasps. Appleton.
Comstock, Manual for the Study of Insects. Comstock Pub. Co.
Seton, Wild Animals I have Known. Scribners.
Bulletins of Departments of Agriculture, Washington, D. C., and Harrisburg.
Chapman, Color Key to North American Birds. Doubleday.
Detmer, Practical Plant Physiology. Macmillan.
Hornaday, Taxidermy and Zoological Collecting. Scribners.
Jordan & Kellog, Animal Life. Appleton.
Pratt, Course in Vertebrates and Invertebrates. Ginn & Co.

BIOLOGY.

A general course in biology may be arranged by making selections from the preceding outlines for botany and zoology.

The character of topics selected will be determined by the main objects of the course. In general, the objects should be to study the life history and habits of the more common type forms of plants and animals, their methods of breeding, and methods of destroying those which are injurious to man; and to show the interdependence of living things upon one another.

Much of the work in the courses in botany and zoology, or biology should have some bearing on the economic benefits to man. The study of various forms of insect life which destroy crops, and the propagation of plants needful to man, and methods of exterminating the injurious types, will be found very profitable, as well as valuable in cultivating an appreciation for the things in nature. It is far more important that the child should be able to see and appreciate the marvelous beauty of nature than to make an accurate sketch of the cellular structure of some microscopic plant or animal. The great problems of sanitation, keeping the town clean, care in storing and preserving foods, relation and selection of seeds and the propagation of plants, and controlling disease are biological problems far greater in value than the knowledge of the unity of all life.

Where a course in general biology is preferred to a separate course in botany or zoology, those topics which have an inter-relation and those in accord with the foregoing suggestions should be selected from the outlines for the courses in botany and zoology.

PHYSICS.

No other scientific subject is so universally taught in the high schools of the state as physics. It is therefore essential that certain standards be definitely established. It is folly to undertake the study without proper equipment. This must include apparatus for the students, available for a considerable group at the same time, that they may work out for themselves a large number of quantitative experiments.

Simplicity is an important quality in apparatus and as a result, great expense may easily be avoided. Boards frequently make the mistake of spending large sums for single pieces or combinations, when less money would buy material better suited for laboratory work.

After the apparatus is secured it should be carefully kept in dust-proof cases, provided with locks. The teachers should have the time and tools to keep the apparatus in good order. Laboratory work to be successful must be thoroughly supervised. A year of nine months is all too short to study a modern text book and complete forty laboratory experiments from the following list, recommended by the Committee of Ten.

The work should be made as practical as the time and the community conditions will permit. The pupils should be taught the working principle of all machinery in use about them. The visits to mills and factories should have a two-fold purpose, namely, to study the physical principle of the machinery in use, and to study the actual business methods employed in their operation.

The work should not be too technical. Lead the pupil by gradual steps to an appreciation of the subject. The experimental work should be largely qualitative. A carefully prepared note book should be kept by each pupil. Some general plan for arranging and recording all experiments should be adopted for all pupils. The note books should be available for inspection at all times.

Limited facilities for doing the laboratory work may necessitate pupils working in groups of two. Whenever posible, however, each pupil should perform the experiments alone. When sufficient apparatus cannot be secured for each pupil or all groups of two pupils working the same experiment at one time, several different experiments may be assigned at one time. The pupils can perform the experiments alternately as previously suggested.

In schools which have terms shorter than nine months and which have a small amount of equipment, the laboratory requirement should consist of 25 to 35 of the most essential experiments from the accompanying list.

In schools of the first class, the pupils should be required to perform individually at least forty experiments selected from the accompanying list. The experiments should be selected to include the several main divisions of the subject of physics.

The following outline offers sufficient material for selection to meet the varying needs of the different districts. The experiments should be selected to meet the individual needs of the community and the apparatus should be purchased accordingly.

OUTLINE.

I. Measurement:
- A. Metric system, linear, square, cubic, mass.
- B. Volume, weight, density.
- C. Properties of matter.
- D. States of matter.

II. Mechanics:
- A. Fluids.
  1. Pascal's Law, Hydraulic press.
  2. Pressure due to gravity.
  3. Pressure varying with depth and density of the liquid.
  4. Pressure on the bottom of the vessel.
  5. Principle of Archimedes.
  6. Specific gravity—solid and liquid.
  7. Gases, relation between pressure and volume.
  8. Atmospheric pressure: Buoyancy, barometer, pumps.
- B. Solids.
  1. Principle of moments.
  2. Parallelogram of forces.
  3. Newton's laws of motion.
  4. Force, momentum, velocity, acceleration.
  5. Falling bodies.
  6. Mechanical work:
     Potential and kinetic energy.
     Conservation of energy.
  7. Machines:
     Kinds of machines. Principle of work applied to machines, mechanical, advantage, friction, efficiency.
  8. Uniform circular motion:
     Centrifugal and centripetal.
     Forces qualitatively illustrated.
  9. Law of universal gravitation.
     Relation of weight to mass.
     Center of gravity.
     Equilibrium.

States.
Equilibrium with two forces.
Equilibrium with three forces, four cases.

III. Heat.
A. Heat a form of energy.
1. Temperature. F. and C. Scales.
B. Sources of heat.
C. Condensation, convection, radiation.
D. Expansion.
1. Solids, liquids, gases.
E. Change of state.
1. Fusion.
2. Vaporization.
3. Boiling.
4. Evaporation.
F. Measurement of heat.
G. Mechanical equivalent of heat.
1. Steam engine.
2. Gas engine.

IV. Sound:
A. Nature and origin of sound.
B. Waves, kinds and propagation.
D. Velocity.
E. Reflection, echoes, resonance.
F. Harmony, discord, beats.

V. Light:
A. Define: Light, luminous body, illuminated body, transparent, translucent and opaque bodies.
C. Pitch, loudness and quality.
B. Waves, nature and velocity.
C. Rectilinear propagation of light in a momogenous medium. Shadows. Pin hole camera.
D. Photometry, laws of invarse squares.
E. Reflection of light.
1. Law. 2 Regular and diffused. 3. Mirrors. 4. Position and character of images.
F. Refraction.
1. Laws.
2. Refraction by plates, prisms, lanses.
3. Lenses: kinds, principal focus, axis.
4. Position and character of images formed by converging and diverging lenses.
G. Dispersion, color, spectrum.
H. Application: Eye, camera, telescope, microscope.

VI. Magnetism:
- A. Magnets: Permanent, temporary, natural, artificial.
- B. Polarity, magnetic attraction and repulsion.
- C. Magnetic induction, magnetic field and lines of force, permeability.
- D. The earth as a magnet, compass, dip, declination.

VII. Static electricity:
- A. Electrification by friction.
- B. Electrical attraction and repulsion.
- C. Condensers.
- D. Conductors, insulators, induction.

VIII. Current electricity:
- A. Simple voltaic cell.
- B. Electro-chemical action.
- C. Local action, polarization and prevention.
- D. Types of cells, Daniel and Leclanche.
- E. Electrolysis. The ampere.
- F. Storage cells.
- G. Electro magnetism.
- H. Magnetic field around a current.
- I. Relation between direction of current and lines of magnetic force.
- J. Electro magnets. Uses.
- K. Electric bell, telegraph.
- L. Resistance:
  1. Ohm's law. 2. The ohm. 3. The volt. 4. Power. 5. Kilowatt hour.
- M. Effects:
  1. Heat. 2. Light. 3. Electric heater. 4. Arc light. 5. Incandescent lamp.
- N. Measurement of electricity:
  1. Galvanometer. 2. Ammeter. 3. Voltmeter. 4. Resistance box.
- O. Grouping of cells. Series and parallel.
- P. Fall of potential.
- Q. Direction and magnitude of E.M.F.
- R. Simple dynamo and motor.
- S. Simple direct and alternating current generator.
- T. Wireless telegraph.
- U. Transformer. Induction coil
- V. Roentgen rays.

EXPERIMENTS.

1. Measuring: Meter stick, vernier, micrometer caliper, curve plotting.
2. Find volume, weight, and density of several solids as wood, stone, iron, etc.
3. Find specific gravity of a liquid.
4. Study action of the siphon.
5. Boyle's law.
6. Hooke's law.
7. Compare elasticity of rubber or brass as to agreement with the laws of elasticity.
8. Strength of materials.
9. Elasticity of bending wood as to length, breadth, thickness.
10. Find the co-ordinate of a given curve drawn upon co-ordinate paper and plot a curve from given co-ordinates.
11. The straight lever. Principle of moments.
12. Center of gravity of a material rod or triangle.
13. Parallelogram of forces.
14. Moments about a fixed point of any number of parallel forces in the same plane.
15. Relation of friction to pressure.
16. Coefficient of friction between solid bodies, on a level and by sliding on an incline.
17. Efficiency test of some elementary machines.
18. Comparison of masses by inertia.
19. Relation of time of vibration of a pendulum to its length.
20. Relation of acceleration to falling bodies, as the moon.
21. Test the gauge lines of a thermometer.
22. Relation between pressure of steam and its temperature.
23. Linear expansion of a solid.
24. Increase of pressure of a gas heated at a constant volume.
25. Specific heat of a substance.
26. Latent heat of water.
27. Latent heat of steam.
28. Dew point of the air of the room.
29. Pitch of tuning fork by column of air in a vessel.
30. Relation of pitch to length of wire.
31. Relation of pitch to tension, and thickness of wire.
32. Velocity of sound.
33. Wave length of sound.
34. Photometer.
35. Images by a plane mirror.
36. Images by a convex mirror.
37. Images by a concave mirror.

38. Index of refraction for glass, for water.
39. Find the critical angle of water.
40. Focal length and conjugate foci of a converging lens.
41. Size and position of real images in a converging lens.
42. Size and position of virtual images in a converging lens.
43. Magnifying power of a lens.
44. Construction of telescope, compound microscope.
45. Magnifying the lines of magnetic force for a bar magnet.
46. Magnetic induction.
47. Study of single fluid cell.
48. Study of a two fluid cell.
49. Magnetic effects of an electric current. Electrolysis.
50. Resistance as to length and cross section of conductors.
51. Resistance measured:
    Voltmeter and Wheatstone's bridge.
52. Battery resistance of combined cells.
53. Methods of connecting cells, with reference to external and internal resistance.
54. Study of induced currents.
55. Electric bell.
56. Electric telegraph.
57. Wireless telegraph.
58. X-rays.

EQUIPMENT.

Much of the equipment required for the foregoing experiments may be made by the pupils. Whenever possible the making of home apparatus should be encouraged. Some of the equipment in the following list can be purchased for use in the study of several other sciences, as chemistry, botany, etc., thus lessening the cost of the apparatus for the physical laboratory. Such equipment as the electric telegraph, electric bell, telephone, etc., may be omitted as these may be borrowed from or studied in offices, stores and factories in the vicinity.

The accompanying list of apparatus is sufficient for a class of ten pupils working in couples on the alternating plan.

A physical laboratory is not complete until sufficient equipment is provided to enable the groups of pupils to work the same experiment at one time. The list of experiments for the year's work should first be ascertained after which the necessary apparatus can readily be selected.

1 table, 8 ft. long, 3½ ft. wide, 3 ft. high, ...	$10 00
1 ten gallon water tank with faucet, ...	6 00
2 meter sticks, ...	50
1 balance with counterpoise, ...	12 00

1 set iron weights,	1 25
10 steel balls, 2 cm.,	50
5 spring balances, 2,000 gr.,	2 50
1 parallelogram of force board,	1 25
1 manometer tube,	25
1 constant weight hydrometer,	40
1 constant volume hydrometer,	30
4 batter jars,	1 00
2 Boyle's law tubes,	60
3 tripods, rods and clamps,	5 00
2 dew point hydrometers,	2 00
4 thermometers C. and F.,	4 00
2 spring and weights holders for Hooke's law,	75
2 steam generators,	5 00
1 coefficient expansion apparatus,	75
1 expansion piece—brass and iron rod,	3 00
1 inclined plane,	1 50
1 carriage for same,	1 00
1 calorimeter,	2 50
2 bar magnets,	60
2 horseshoe magnets,	50
1 compass,	1 25
1 electroscope,	1 00
2 voltaic cells,	1 25
2 porous cups,	20
2 sets carbon and copper plates,	50
1 D'Arsonval galvanometer,	2 25
4 1,000-ohm resistanec coils,	1 25
1 Wheatstone's bridge,	2 25
6 dry cells,	1 50
1 induction coil,	5 00
1 electric bell,	50
2 push buttons,	25
1 electric motor,	5 00
1 apparatus for measuring vibration rate of tuning fork,	4 25
1 tuning fork of each, 256, 385, 512 vibrations,	3 25
1 protractor,	35
2 prisms,	75
2 concave mirrors,	60
2 convex lenses,	1 00
2 plane mirrors,	50
1 electric telegraph outfit,	3 25
1 wireless telegraph outfit,	10 00
5 ft. rubber tubing,	1 50

1 lb. sulphuric acid,	50
1 lb. ether,	50
1 lb. copper sulphate crystals,	15
1 lb. zinc sulphate crystals,	10
1 funnel,	10
1 nest beakers,	1 00
1 Wimshurst machine,	12 00
2 Leyden jars,	2 25
1 air pump,	23 00
1 bell jar,	2 50
1 set pulleys,	1 50
1 set weights, 1 g. to 1,000 g.,	3 00
1 sq. ft. thin sheet rubber,	35
1 barometer tube,	80
1 wheel and axle,	1 45
2 Bunsen burners,	70
or	
2 alcohol lamps,	76
1 magnetic needle (mounted),	1 25
1 lb. iron filings,	20
1 glass rod,	10
1 silk pad,	25

REFERENCE BOOKS.

Cathcart, University Physics, (2 vols.). Allyn & Bacon.

Ganot, Physics. Wm. Wood & Co.

Lodge, Pioneers of Science. Macmillan.

Duncan, The New Knowledge. A. S. Barnes & Co.

Smith and Hall, The Teaching of Chemistry and Physics. Longmans.

Whitman, Recent Developments of Physical Science. P. Blackstone

Hopkins, Experimental Science. Munn & Co.

S. P. Thompson, Elementary Lessons in Electricity and Magnetism. Macmillan.

School Science an d Mathematics. Chicago, Ill.

Ames and Bliss, Experiments in Physics. American Book Co.

Woodhull, Homemade Apparatus. Barnes.

Woodhull, Simple Experiments in Physics (2 vols.). Barnes.

Cajori, History of Physics. Macmillan.

CHEMISTRY.

Schools that maintain a three years' course should not undertake this subject at all, and without facilities for laboratory work, its study is of very doubtful value in any school. Experience shows that a year of nine months is necessary for effective work. Probably the best division of the time is in proportion of three recitation and two double laboratory periods per week. The size of the laboratory groups will be determined largely by the facilities, but not more than twenty pupils can be properly supervised in experimental work.

The purpose of the course in secondary schools is mainly disciplinary. It provides excellent training in observation and in logical thinking and gives a knowledge of important natural and industrial processes. The ability to do, to observe accurately, to make logical inferences, and to express results in good English, are of more value than the acquisition of many facts, however important. With this aim admitted, the laboratory note book becomes the center of interest for the teacher. He must assure himself that his pupils are thinking and not doing their work mechanically. Descriptions of experiments should be written at the time they are performed.

The use of the chemical equation and formula should be restricted, especially in the earlier part of the work. Analytical work cannot be emphasized in a course that is so limited in time.

In order to give a practical training in the course such subjects as the following might receive greater emphasis than the text-books usually give them: Chemistry of cooking, of the laundry, of making soap, of soils, and of foods. Pupils should be encouraged to analyze water from nearby wells, to analyze milk to determine the fat content, to study local manufactories of cheese, ice cream, candies, to test the coal tar dyes in candies, the extraction of oils from herbs, and spices, the determination of the alcoholic content of patent medicines, the percentage of ash in the coal supply, the practice of removing stains, bleaching, etc. If the school is located in a manufacturing community, visits should be made by the class to the factories, and any chemical processes used should receive special attention.

The course in chemistry will prove more valuable if the practical knowledge of the properties and chemical changes of matter is emphasized. The three important points for emphasis are:

1. Accuracy in performing an experiment and in making observations.
2. Observation of phenomena with accuracy in interpretation, and description.
3. Application of knowledge gained.

All subject matter should be frequently reviewed and comparisons made when possible.

The following is a suggestive order for the study of any substance:

1. Characteristics.
2. Occurrence.
3. Preparation.
4. Uses and applications.

Pupils in schools of the first class should be required to keep a carefully prepared notebook which shall contain, in full, the statement, procedure and results of at least thirty experiments to be selected from the accompanying list and performed individually. In schools of other classes, fifteen to twenty experiments should be required of each pupil.

OUTLINE.

1. Physical and chemical changes in matter.
2. Elements: compounds, mixtures, solutions.
3. Metals.
4. Non-metals.
5. Chemical symbols.
6. Oxygen—oxidation.
7. Hydrogen.
8. Laws: Boyle's and Charles'.
9. Water.
10. Atmosphere.
11. Other gases.
12. Acids, bases, salts. Most useful kinds.
13. Halogens.
14. Nitrogen and nitrogen compounds.
15. Atomic hypothesis.
16. Chemical equations.
17. Physical conditions as related to chemical action.
18. Sodium and potassium compounds. Uses.
19. Sulphur and its compounds.
20. Carbon and its compounds.
21. Ionic theory and electrolysis.
22. Theory of chemical equilibrium.
23. Phosphorus and phosphates.
24. Silicon and silicon compounds.
25. Metals, only most common.
26. Some common organic compounds.

EXPERIMENTS.

1. Heating substances in air.
2. Heat a mixture of iron filings and sulphur.
3. Decomposition of a compound. Heat mercury in air.
4. Heat zinc dust.
5. Heat copper filings.

6. Preparation of oxygen from Potassium chlorate and manganese dioxide.
7. Experiments with oxygen gas.
8. Tests for acids.
9. Preparation of hydrogen. Electrolysis of water.
10. Preparation of hydrogen from acids.
11. Effect of sodium on water.
12. Action of an acid on a metal oxide.
13. Action of acid on zinc.
14. Action of hydrogen on copper oxide.
15. Show impurities of water and methods of removal.
16. Experiment hard and soft water.
17. Solutions.
18. Neutralization of acids and bases.
19. Preparation of hydrochloric acid.
20. Preparation of a salt. Four ways.
21. Insoluble salt.
22. Experiment in bleaching.
23. Preparation of nitrogen.
24. Preparation of nitric oxide.
25. Preparation of nitric acid.
26. Oxidizing power of nitric acid.
27. Determine combining weight of magnesium.
28. Properties of sulphur.
29. Preparation and properties of sulphur dioxide.
30. Preparation and properties of hydrogen disulphide.
31. Process of burning.
32. Examination of flames.
33. Fractional distillation.
34. Preparation of soap.
35. Composition of marble.
36. Preparation of lime.
37. Lime water and tests.
38. Preparation of carbon dioxide. Uses.
39. Preparation of hydrocarbons.
40. Flame test for metals.
41. Borax bead tests.
42. Making blue prints.
43. Practice in photography.
44. Mordants and process of dyeing.
45. Preparation of ammonium hydroxide.
46. Preparation of artificial gas.
47. Dissociation of mercuric oxide.
48. Burn sodium, magnesium and potassium in air. Study the products.

49. Burn iron in oxygen. Study the products.

50. Combine substances formed by burning sulphur and phosphorus in air, with water.

51. Proportion by weight in which hydrogen and oxygen unite.

52-55. Tests for four metals of those selected for study in unknown mixtures.

56. Preparation and study of iodine.

57. Atomic weight of metals or zinc and silver by displacement.

58. Decomposition of ammonium nitrate. Study nitrous oxide.

59. Composition of a gas formed by action of nitric acid on copper.

60. Test for presence of carbon in common substances.

61. Fermentation and products.

EQUIPMENT.

The following equipment will be sufficient for six pupils working at a time. Some supplies commonly used have been omitted. In schools where the work cannot be carried out as indicated owing to lack of facilities, a selection of the required number of experiments should be made from the foregoing list and the supplies and apparatus purchased accordingly, after which additions can be made annually.

1 table 7ft. long, 3½ ft. wide, 3 ft. high,	$10 00
1 wall sink—gas and water connection,	15 00
or	
2 ten gallon iron tanks for water and waste water,	3 00
1 bottle shelf,	1 00
10 stock bottles,	2 50
20 reagent bottles,	4 75
10 small reagent bottles,	1 25
24 wide mouthed bottles for solids,	75
2 mortars,	75
1 funnel,	50
3 nests of beakers,	1 10
3 Bunsen burners,	1 25
10 collecting jars,	1 00
3 blow pipes,	30
Assortment of corks,	
3 nests of crucibles,	
4 25 c.c. graduated cylinders,	1 40
1 lead dish,	50
3 pkgs. filter paper,	40
2 each, 4, 8, 16, oz. flasks, average,	1 20
3 prs. forceps.	40
6 glass funnels,	60

12 rubber stoppers, 1 and 2 holes,	1 00
2 lbs. glass tubing,	80
1 quire litmus paper,	60
12 ft. rubber hose, 1-4 and 3-16 inch.,	1 45
4 sand baths,	15
1 balance,	10 00
2 sets weights, 1 to 20 grams,	1 25
1 gross assorted test tubes,	2 25
3 test tube racks,	1 00
12 hard glass test tubes, 6 inch,	1 00
12 clay triangles,	40
1 pneumatic trough, home construction,	
3 ring stands, 4 rings, each,	2 00
6 test tube brushes,	40

CHEMICAL SUPPLIES.

1 lb acetic acid,	$ 15
½ lb. arsenic trioxide (acid)	05
6 lbs. hydrochloric acid,	60
1 lb. ammonium nitrate,	30
2 lbs. nitric acid,	25
4 lbs. ammonium hydroxide,	50
½ lb oxalic acid,	05
5 lbs. sulphuric acid,	25
1 qt. alcohol,	90
1 lb. alum,	10
1 lb. ammonium chloride,	15
1 lb. calcium chloride,	30
1 lb. antimony,	20
1 lb. barium chloride,	25
1 lb. calcium sulphate,	10
2 lbs. copper sulphate,	20
1 lb. animal charcoal,	25
1 lb. carbon disulphid,	25
½ lb. copper oxide,	75
¼ lb indigo,	50
½ lb. lead nitrate,	10
1 oz. iodine,	30
1 lb. iron sulphate,	05
1 lb. iron sulphid,	15
1 lb. iron filings,	10
1 lb. sheet lead,	15
½ lb. lead peroxide,	25
¼ lb. litmus solution,	15
⅛ lb. magnesium ribbon,	25

2 lbs. magnesium dioxide,	25
1 lb. paraffine,	20
⅛ lb. yellow phosphorus,	15
½ oz. potassium metal,	40
1 lb. potassium bichromate,	25
1 lb. potassium carbonate,	10
1 lb. potassium chlorate,	25
1 lb. potassium nitrate,	15
1 lb. potassium hydroxide,	50
1 lb. zinc sulphate,	10
2 lbs. powdered zinc,	40
3 lbs. sodium sulphate,	10
¼ lb. sodium,	65
2 lbs. sulphur,	10
1 lb. sodium nitrate,	10
2 lbs. sodium carbonate,	20
1 lb. borax,	15
1 lb. disodium phosphate,	25
½ lb. sodium acetate,	20

REFERENCE BOOKS.

Smith and Hall, The Teaching of Chemistry and Physics. Longmans.

Tilden, Hints on Teaching Chemistry. Longmans.

Remsen, Chemistry (advanced). Holt.

Dobbin and Walker, Chemical Theory for Beginners. Macmillan.

Newth, Inorganic Chemistry. Longmans.

Oswald-Findlay, Inorganic Chemistry. Macmillan.

Jones, Modern Theory of Solution. American Book Co.

AGRICULTURE.

Economic conditions have changed quite materially during the past quarter of a century. It is the business of the public schools to keep pace with these changing conditions in order that they may perform the functions for which they are operated. Industrial and agricultural conditions of the present day make it imperative that the boys and girls receive some specific training which shall fit them to take their places as bread winners. In response to this insistent demand agricultural and industrial education has been incorporated into our public school system.

Instruction in agriculture is now required by law of all township high schools. Many borough high schools are establishing courses in agriculture because of the public demand for it, the demand being based upon an economic need for it.

The type of instruction that is here outlined is intended for those township and borough high schools offering a course in agriculture as one course among several in a scheme to furnish a general education. No state aid is granted for this type of agricultural instruction. School districts desiring to establish and maintain vocational agriculture for which state aid is granted should write to the Vocational Division of the Department of Public Instruction at Harrisburg, asking for a copy of the bulletin entitled "Agricultural Schools and Departments." This bulletin explains the standards and requirements governing the agricultural schools qualifying for State aid.

Township and borough high schools offering a course in agriculture should devote one year's time to the subject, although a one-half year's course will be accepted as a minimum. At least three recitation and two double laboratory periods should be devoted to this work in agriculture each week. This work should consist of recitations, laboratory experiments, field trips and some practical work carried on by each member of the class at home.

It should be clearly kept in mind that it is the quality of the work and not the quantity that is of the most importance. It is impossible to cover all phases of agricultural instruction in the limited time accorded this subject in the high school. In these schools a general survey of agricultural conditions and methods should be given. This should be followed by a thorough, detailed and practical study of one or two agricultural topics, such as soils, fruit raising, dairying, etc. The quality and extent of this work must be such as to put it on a par with the other high school sciences. This will necessitate the purchase of a certain amount of apparatus which should be properly cared for after it is purchased.

The pupils of the agricultural class should keep an accurate record of demonstrations, experiments and field trips.

Farm arithmetic problems should be given in connection with each agricultural topic and not as a separate arithmetic course.

The class in agriculture should be permitted to attend orchard demonstrations and other such meetings conducted in the vicinity by the School of Agriculture of State College, or by officers of the State Department of Agriculture.

Collections of grains, grasses, weed seeds, economic insects and the various woods will be of great value. An economic set of seeds can be secured from the U. S. Department of Agriculture at Wsahington, D. C., for a nominal sum.

A study of the proper methods of selection and storage of seed corn and germination tests of the same should be carried on each year. In all high schools located in country districts seed corn should be tested free every spring for all farmers desiring this help.

The teacher of agriculture should send to the Editor and Chief of the Division of Publications, U. S. Department of Agriculture, Washington, D. C., and to the Extension Department, School of Agriculture, State College, Pa., for the various agricultural bulletins which are issued free of charge.

Teachers of agriculture are urged to consult freely with the Expert Assistant in Agricultural Education of the Vocational Division of the Department of Public Instruction, Harrisburg, Pa., in regard to the various phases of Agricultural instruction.

The following suggestive outlines on Soils, Fertilizers, Farm Crops, Fruit Raising and Vegetable Gardening will give an idea of the manner in which the various agricultural topics should be treated.

SOILS.

General:

Origin, kinds, surface and subsoil, glacial, residual, specific gravity, moisture and air of the soil, soil capillarity, drainage, irrigation, moisture retainingg capacities of the various soils, soil temperature, effect of humus and lime, tillage operations and implements.

Exercises:

Collection and study of various soils.
Separation of mixed soil into component parts.
Specific gravity of various soils.
Presence of air in soils.
Surface and subsoil differences.
Relative productivity of soil and subsoil.
Determination of per cent. of water, organic matter and mineral matter in soils.
Moisture retaining capacities of soils.
Capillary rise of water in different soils.
Effect of humus on absorption and retention of moisture.
Effect of humus and lime on texture of soils.
Effect of soil mulch.
Soil temperatures, relation of humus and water to same.
Study of soils of the community.

Apparatus:

A. *General:* (for class of ten).
5 boxes for supply of soils.
2 balances weighing to centigrams.

1 set of weights for same.
1 soil auger.
5 soil sieves.
5 alcohol lamps.
Soil survey map and report (issued by the U. S. Bureau of Soils).

B. *Individual:*

5 bottles or boxes for soil samples.
4 specific gravity bottles.
6 six-inch flower pots.
4 student lamp chimneys (large bottles can be used).
1 soil tube rack (should be made by the student).
1 shallow pan.
4 pint fruit jars.
1 crucible or iron spoon.
Individual equipment may be reduced materially by rotation of experiments.

References:

Soils—Burkett—Orange Judd Company.
The Soil—King—The Macmillan Company.
Soils—Lyon and Fippin—The Macmillan Company.
Agronomy—Clute—Ginn & Company.
The Fertility of the Land—Roberts—The Macmillan Company.
Soil Physics Laboratory Manual—Mosier and Gustafson—Ginn & Company.
Soils—Fletcher—Doubleday, Page & Company.
Soils and Crops—Barto—D. C. Heath & Company.

FERTILIZERS.

General:

How plants feed, source of plant food, air, moisture, the elements, soil analysis, alkali and acid soils, humus, soil and air nitrogen, nitrogen fixing, nitrification, use of legumes, farm manures, composition and value, preservation of same, composts, care and handling of manure, commercial fertilizers, source and composition, how to purchase, how to mix, when and how to add fertilizers to the soil, use of wood ashes, lime.

Exercises:

Study of Osmosis or how plants feed.
Study color, texture and odor of the various fertilizer materials.
Exercises showing the effect on plant growth when fertilizing elements are applied alone and in various combinations, including the use of lime.
Test for acidity and alkalinity of soils.

Compute the percentage composition of several complete fertilizers.
Several exercises in mixing fertilizers, computing cost of same.
Study of legumes.
Innoculation of soil for alfalfa.
Inspection and report of all nearby farms as to method of caring for and handling farm manure.
Report from each student of kinds of farm manures and fertilizers used on home farm or nearby farm showing amounts used and time and method of application, cost of same.
Study of statements on fertilizer sacks.

Materials:

A. *General:*

Bottles of fertilizer elements and samples of fertilizers as sold by fertilizer companies.
Supply of fertilizers for practice in mixing.
Lime in three forms.
Supply of blue litmus paper.
Supply of red litmus paper.

References:

Fertilizers—Voorhees—The Macmillan Company.
Soil Fertility and Permanent Agriculture—Hopkins—Ginn & Co.
Soils and Fertilizers—Snyder—The Macmillan Co.
Soils—Fletcher—Doubleday Page & Co.
Fertility of the Land—Roberts—The Macmillan Co.

Farm Crops.

CORN.

(Other crops to be treated in a similar manner.)

General:

Value as a crop, distribution, types, varieties grown in community, study of botanical characteristics, kind of soil best adapted to corn, kinds and amounts of fertilizers, time and method of planting, cultivation, harvesting and storing, selecting of seed corn, corn judging, winter storage of same, germination test of seed corn, improvement of seed, ear to row method, corn as a feed, insect pests and fungous diseases with control of same, corn fodder, silage.

Exercises:

List of varieties grown in community.
Study of reports of State and National Departments of Agriculture for valuation and yields.
Test various soils for corn by growing in flower pots.

Test effect of various fertilizers.
Individual reports from each student on some field of corn covering entire history of crop.
Estimate of loss in field due to empty hills and barren stalks.
Selection and judging of seed corn.
Winter storage of seed corn in various ways (students should make racks).
Germination test.
Collection and preservation of insect pests and fungous diseases.

Materials:

A. *General:*

Supply of various soils.
Supply of various fertilizers.
Supply of seed corn for judging.
Germination box or boxes (to be made by students).
Racks for storing corn (to be made by students).
Bottles and cases for insect and fungous collections.

B. *Individual:*

2 plates or saucers.
4 six-inch flower pots.
Rag-doll tester (made by student).

References:

Crops and Methods for Soil Improvement—Agee—The Macmillan Company.
Cereals in America—Hunt—Orange Judd Co.
Forage and Fibre Crops in America—Hunt—Orange Judd Co.
Corn Plants—Sargent—Houghton, Mifflin & Co.
Forage Crops—Voorhees—The Macmillen Co.
Corn—Bowman and Crossley—Ames, Iowa.

Fruit Raising.

(ORCHARDS.)

General:

Distribution and valuation of fruit industry, future prospects, selection of site for orchard, market, distance to market, soil, exposure, air and water drainage, study of varieties, varieties best adapted to soil and climate and market, where and how to purchase stock, methods of planting, sod mulch, cultivation of orchard, interplanting, inter cropping, cover crops, budding and grafting with reason for same, top grafting, picking, boxing, barreling, baskets, storing, marketing, fungous diseases and insect enemies with control of same, fertilizers, dwarf trees, study of home orchard.

Exercises:

Study of reports of State and National Departments of Agriculture.
Inspection trips to several orchards to study points noted above.
Make list of varieties grown in neighborhood with number of trees of each kind.
Fruit judging.
Study of nursery catalogs.
Exercises in budding and grafting.
Making of grafting wax.
Attend orchard demonstrations conducted by the State Department of Agriculture.
Exercises in pruning.
Exercises in spraying.
Making of Bordeaux mixture.
Use of lime-sulphur.
Planting of fruit trees on school and home grounds.

Materials:

A. *General:*

Collection of apples of the various varieties for use in fruit judging exercises.
At least one budding and grafting knife.
One pruning saw.
One pair of pruning shears.
One pruning knife.
Beeswax.
Tallow.
Copper sulphate.
Quicklime.
Flowers of sulfur.
Lead arsenate.
One hundred or more seedlings for practice in grafting and budding.

References:

The American Apple Orchard—Waugh—Orange Judd Co.
Nursery Book—Bailey—The Macmillan Co.
The Principles of Fruit Growing—Bailey—The Macmillan Co.
The Pruning Book—Bailey—The Macmillan Co.

VEGETABLE GARDENING.

General:

List of vegetables for home garden, time of planting of each, kind of soil with treatment before planting, fertilizers kind and amounts, cultivation, irrigation, the Skinner system, economy of

space, late crops take place occupied by early crops, construction and use of cold frames and hot beds, intensive versus extensive cultivation, use of vacant lots for gardening by students for pleasure and profit, school gardens.

Exercises:

Secure ground for school gardens, or better yet, have each student take charge of a portion or all of home garden for full season, keeping accurate records and making report at end of season.

Construction of cold frame and hot bed, at home or at school, or both.

Devote portion of school garden to varieties not common in neighborhood.

Study of several vegetable plants in winter by means of use of flower pots and window boxes.

Materials:

A. *General:*

Plot of ground for gardening.
Seeds of various vegetables.
Lumber and sash for cold frames and hot beds.
Window boxes and flower pots.

References:

Vegetable Gardening—Watts—Orange Judd Co.
Principles of Vegetable Gardening—Bailey—The Macmillan Co.
How to make a Vegetable Garden—Fullerton—Doubleday, Page & Co.
How to Grow Vegetables—Franch—The Macmillan Co.
School and Home Gardens—Meier—Ginn & Co.
The Home Garden—Rexford—Lippincott Co.
Four Seasons in the Garden—Rexford—Lippincott Co.
Gardens and Their Meaning—Williams—Ginn & Co.
Amateur Gardencraft—Rexford—Lippincott Co.
Indoor Gardening—Rexford—Lippincott Co.

DRAWING.

The high school course of study in drawing depends largely upon what has been accomplished in this subject in the elementary schools. Careful consideration of the work in the elementary schools and a short but effective summary at the beginning of the high school work will do much toward leading the student into the more serious work of the high school.

High school drawing must necessarily differ from the work done in the elementary schools. The courses must be adapted to the needs of the student. Hence we have differentiation.

Drawing is a subject of great practicability and keen refinement. It broadens the vision and enables the willing person to get a deeper insight into the real things of life.

Aim.

The aim in the high school should be to develop along the lines which appeal to the student and thereby enable him to respond to that which is beautiful. The primary reason for art in the high school is not to teach drawing, but to quicken and develop the aesthetic sense of the community. We must, therefore, adapt the subject matter to the needs of the high school pupils in a way that will enable them to apply it in their surroundings.

The aesthetic sense comes to the fore in this stage of the student's development and he is more emotional, more sensational and more introspective.

If this tendency can be rightly directed it will influence the student's surroundings,—his home, his person and his actions. There is great opportunity to influence his surroundings through problems adapted to the home, clothing, architecture, etc.

The development and appreciation of what is beautiful is the development of taste. Good taste is born of good relationships. To train taste is to give abundant opportunities for choice. The best opportunity comes in the teaching of good design.

Our work, therefore, naturally divides itself into two main lines of training—those of representation and design.

Through representation we train for careful perception, correct proportions, and skill in handling of mediums. Through design we develop the principles of appreciation as applied to things around us.

The following is an outline of courses in drawing suitable for a high school maintaining four years of work.

COURSE IN DRAWING.

First and Second Years.	*Third and Fourth Years.*
Freehand Division.	General Arts Course. Teachers' Training Course. Girls' Industrial Course.
Mechanical Division.	Architectural Course. Boys' Industrial Course.

There are two main divisions in the course of study, namely, the Freehand Division and the Mechanical Division. Differentiation takes place in both divisions at the beginning of the third year of the course.

The freehand work may be divided into three distinct courses at this period, namely, The General Art Course, The Teachers' Training Course, and The Girls' Industrial Course.

The General Art Course is planned for those students who have more than ordinary ability in the subject and desire to specialize along that line. Students desiring to enter an art school should have this line of training.

The Teachers' Training Course is planned for students who expect to become teachers and who will probably enter a normal school. The Girls' Industrial Course is supposed to give an all around training in art and is planned to help the girls in making their surroundings more beautiful and thus make their lives more happy.

Freehand Division.

First Year.

Representation:—Large accented pencil outline drawings of interesting fall growths. Careful arrangement on paper with regard to placing, proportion, etc. Study of the turning of leaves. Drawings in colored crayon on tinted paper of flowers, fruits and vegetables. Painting of some in water color—large quick sketches. Groups of interesting objects in outline and color. Perspective principles applied to interior and outdoor views. Large quick sketches from animals. Pose drawing.

Design:—Study of principles of design. Spacing. Simple arrangement of units of design in borders and all over patterns. Application to problems—book covers, Christmas cards, place cards, etc. Simple lettering.

Arrangement of flowers, fruits, etc., in good composition. Painting of composition in neutral tones. Study of color harmony applied to composition.

Second Year.

Representation:—Study of plant form. Plant analysis sheets with attention to arrangement. Still life groups in crayon and charcoal. Pencil painting of still life and simple landscapes. Drawings from animals. Animal drawings from memory. Figure drawing.

Design:—Use sketches in making posters and covers for school journal. Special attention to lettering. Color study in compositions of plant form and still life. Design made by conventionalization of plant forms to be used in wood blocks and stencils.

Advanced Art Course.

Third Year.

Representation:—Still life, flowers, fruits, etc., in water color. Use of background. Drawing from historic ornament. Cast drawing. Art History—architecture. Animal and figure drawing and composition. Outdoor sketching in pencil and color.

Design:—Study of color. Application in composition and design. Hand made tiles, bowls and plant boxes. Clay modelling from fruits and vegetables.

Fourth Year.

Representation:—Cast drawing. Study of still life for correct representation of spouts, handles and other details. Study of perspective, developing and applying of principles. Art history—painting and sculpture.

Design:—Study of alphabets. Designing of headings, tail pieces, title pages and initial letters. Posters. Modeling of animals and figures from life. Casting in plaster.

Teachers' Training Course.

Third Year.

Representation:—Careful pencil drawing of fall growths. Flowers and fruit in water color. Study uses of tinted papers. Blackboard drawing. Current Art Notes. Study of Art Industries.

Design:—Application of designs to objects suitable for problems in the elementary grades—portfolios, note book covers, bags. Problems in weaving.

Fourth Year.

Representation:—Still life in charcoal with crayon or water color added. Same method applied to landscapes. Study elementary courses of study. Methods. Current Art Notes. American Art Galleries.

Design:—Application of design to problems suitable for elemetary grades. Basketry—sewed and woven baskets, mats, bags.

Girls' Industrial Course.

Third Year.

Representation:—Sketching from flowers, fruits, seed pods, berries, etc., for use as motifs for design. Drawings of interiors. Study of proportion.

Design:—Design applied to articles of clothing, belts, waists, millinery, bags, scarfs. Book binding. Tooled and cut leather. Metal problems.

Fourth Year.

Representation:—Drawing of furniture and interiors.

Design:—Problems centering about the home. Design applied to pillows, mats, portiers, wall papers, china. Designs for furniture—line and proportion. Historic furniture. Textiles. Color schemes for interiors. Good and bad home furnishings compared. Embroidery problems. Study of lace designs. Study of good vase forms. Artistic arrangement of flowers.

Three Years' Course of Study.

Schools maintaining three years of work may follow for the first year the work outlined for the seventh and eighth grades which is as follows:

Seventh and Eighth Grades.

Materials—paper, pencil, charcoal.

September and October.

Draw in accented outline leaves in different positions.

Draw in accented pencil outline using more difficult subjects than the intermediate grades.

Flowers—clover, sunflower, aster, etc.

Use enclosing form and initial.

Draw large specimens of milkweed with leaves, wild sunflower—dried, corn stalk.

Draw fruits on branch and make composition of same using frame line.

Borrow brushes from intermediate grades and make compositions in tones.

November and December.

Draw books and baskets in different positions. Group fruit with basket. Two books grouped. Lemon with glass, etc.

Construct a portfolio, envelope or some other useful article.

Make suitable decoration and apply to same.

A calendar or cover for an essay may be made.

Draw in large accented outline, hats, shoes.

January and February.

Make winter landscape in simple charcoal tones. Buildings may be used. Paint pencil landscape using buildings.

Geometric Problems.

1. To bisect a straight line.
2. To erect a perpendicular at the end of a line.
3. To construct a square.

4. To construct an equilateral triangle.
5. To draw line parallel to a given line.
6. To construct a regular hexagon.

Make freehand working drawings of cube, square prism, triangular prism, cone, cylinder.

Make working drawing of a spool or ink bottle, a working drawing of a plain desk or table.

March and April.

Draw in accented outline twigs, horse chestnut, lilac, apple.

Flowers—tulip, daffodil, marsh marigolds, fruit blossoms, blue flag, etc.

Borrow crayons or brushes and place flowers in composition.

The first and second years' work of the above four years' course may be used during the second and third years of the three years' course.

Two Years' Course of Study.

Schools maintaining two years of work may follow for the first year the work outlined for the seventh and eighth grades. During the second year, they may follow the outline for the first year of the four years' course.

It is supposed that the work in many of these schools is just being introduced and therefore must necessarily be more elementary. In the limited amount of time which can be devoted to the subject in these courses it is scarcely possible to differentiate. Hence, a general course is necessary. If, however, it is possible to carry the work farther, sufficient material will be found in the outlines of the advanced courses of study.

List of Helps for Teachers.

REPRESENTATION.

Clark, E. E.,	Plant Form,	Lane.
Cross, Anson,	Freeehand Drawing,	Ginn & Co.
Bailey, H. T.,	Tree Studies in Silhouette,	School Arts Pub. Co.
Bailey, H. T.,	Nature Drawing,	Atkinson, Mentzer & Co.
Bailey, H. T.,	Nature Packets,	School Arts Pub. Co.
Dow, Arthur,	Composition,	Doubleday, Page & Co.
Haney, James P.,	Pencil Sketching,	National Arts Pub. Co.
Hammock, A. G.,	The Loose Leaf Drawing,	Loose Leaf Pub. Co.
Hammock, C. S.,	Blackboard Drawing,	A. S. Barnes Co.
Hatton, R. G.,	Figure Composition,	Lippincott.
Jacobs, H. W.,	Antique Buildings,	Scott, Foresman & Co.
Koch, L. W.,	Pencil Sketching,	Prang Co.
Miller, L. W.,	Essentials of Perspective,	Scribners.
Morton, Dora M.,	Freehand Perspective,	Pratt Institute.
	Art Education for High Schools	Prang Co.
Speed, Harold,	The Practice and Science of Drawing,	Lippincott.
Warner, Earl A.,	Tree Studies,	Scott, Foresman & Co.
Whitney, Frederick,	Blackboard Drawing,	The Davis Press.
Woodbury, Chas.,	Pencil Sketches,	Milton Bradley Co.

DESIGN.

Batchelder, Ernest A.	Design in Theory and Practice,	Macmillan
Branch, Elizabeth Garabrant	Illustrated Exercises in Design,	Prang Co.
Crane, Walter,	Picture Books,	John Lane Co.
Day, Lewis F.	Pattern Design,	Scribners.
Day, Lewis F.,	Nature and Ornament,	Scribners.
Daniels, Fred. H.,	The Furnishing of a Modest Home,	Davis Press.
DeForest, Lockwood,	Illustrations of Design,	Ginn & Co.
Hammock, A. G.,	Loose Leaf Drawing,	The Loose Leaf Pub. Co.
Hammond, Edith Cary,	Industrial Drawing,	Redfield Bros.
Haney, James P.,	Classroom Practice in Design,	Manual Arts Press.
Jackson, Frank G.,	Lessons on Decorative Design,	Lippincott.
Jackson, Frank G.,	Theory in Practice of Design,	Lippincott.
Lawrence, Maude, and Sheldon, Caroline,	The Use of the Plant in Decorative Design,	Scott, Foresman & Co.
Midgley & Lilley,	Plant Form and Design,	Scribners.
Ross, Denman W.,	A Theory of Pure Design,	

ART HISTORY AND ART APPRECIATION.

Caffin, Chas. H.,	Art for Life's Sake,	Prang.
D'Anvers, N.,	Elementary History of Art,	Scribners.
Emery, Mable S.,	How to Enjoy Pictures,	Prang Co.
Gardner,	A Grammar of Greek Art,	Macmillan.
Goodyear,	A History of Art,	A. S. Barnes Co.
Turpin,	Famous Painters,	Maynard, Merrill & Co.
Van Dyke,	The Meaning of Pictures,	Scribners.
Waldstein,	Art in the Nineteenth Century,	Macmillan.
	Masters in Art,	Bates & Guild Co.
	Great Artist Series,	Educ. Publishing Co.

LETTERING.

Lyons,	Grammar of Lettering,	Lippincott.
Shaylor, H. W.,	Book of Alphabets,	Ginn & Company.
	Decorative Initials,	The Davis Press.
	The Monastic Text,	
	Guild Alphabet,	
	Old English Text,	

COLOR.

Munsell, A. H.,	A Color Notation,	Geo. H. Ellis Co.
Vanderpool,	Color Problems,	Longmans, Green & Co.
Ross, Denman,	Theory of Pure Design, (Chapters on Color)	Houghton, Mifflin Co.

PICTURE STUDY.

Perry Pictures,	Perry Picture Co.
Elson Prints,	Elson Art Publication Co.
University Prints,	Bureau of University Travel.
Turner Prints,	Horace K. Turner.
The Copley Prints,	Curtis & Cameron.

MAGAZINES.

International Studio,	John Lane.
The Craftsman,	Gustav Stickley.
School Arts Magazine,	School Arts Pub. Co.

EQUIPMENT.

Good results in drawing do not depend upon an elaborate equipment. Good work may be done with few materials in an ordinary class room. However, in order to carry out a four years' course as outlined it is necessary to have the proper materials and equipment.

There follows what might be considered a desirable equipment for a drawing room of a school where a four years' course of study is maintained.

If considerable work in the different crafts is pursued, special outfits may be needed for such lines of work as book-binding, metal work, jewelry or pottery.

Equipment (desirable for a first-class high school).

A well lighted room.

Drawing tables placed so that light falls from the left side.

Pedestals or stands on which to arrange studies sufficient in number to accommodate the classes.

A good sized blackboard.

A good sized poster board of burlap or other material of good texture and quiet coloring on which to exhibit drawings.

Still life subjects such as vases, pitchers, teapots, bean jars, bowls, bottles, jugs, baskets, etc.

Cases or shelves in which to keep still life and other materials.

Large jars for holding flowers.

A few casts—panels, masques, busts.

A library of helpful books for teacher and pupils.

Materials (desirable for a four years' course).

Drawing Boards.

Drawing paper:
- Heavy water color paper,
- Light weight water color paper,
- Tinted paper,
- Tracing paper,
- Squared paper,
- Charcoal paper,

Manila paper:
- white
- cream
- grey

Blotters.

Water colors in tubes:
- Reds:
  - Alizarin Crimson
  - Rose Madder
  - Vermillion
- Blues:
  - New Blue
  - Cobalt Blue
  - Prussian Blue
- Yellows:
  - Cadmium Pale
  - Cadmium Deep
  - Indian Yellow
- Burnt Sienna
- Black
- Chinese White

Water colors—in boxes.

Palettes

Brushes:
- Camel Hair or Sable:
  - Large
  - Medium
- Bristle (flat):
  - Large, 1½ in. wide.
  - Medium, ¾ in. wide.
  - Small, ½ in. wide.

Pencils:
- Soft Sketching Pencil.
- Medium Sketching Pencil.
- Hard Sketching Pencil.

Colored Crayons.
India Ink.
Scissors.
Compasses.
Charcoal
Erasers.
Thumb Tacks.
Sloyd Knives.
Leather tooling tools.
Paste.
Rulers.

Equipment (necessary for a three years' course).

Ordinary classroom.

Boards to place across aisles on which to arrange studies.

Poster board of good size.

Blackboard of good size.

Still life subjects such as vases, pitchers, teapots, bean jars, bowls, bottles, jugs, baskets, etc.

(Many of these articles can be brought from the home. Others can be bought at five and ten cent stores).

Cases or shelves for still life and other materials.

Helpful books.

Materials (necessary for a three years' course).

Drawing paper:

Manila { white / grey / cream

Tinted papers.
Tracing papers.
Squared papers.
Charcoal papers.

Blotters.
Water color in boxes (three colors and black).
Scissors.
Paste.

Pencils { Soft. / Medium. / Hard.

India Ink.
Compasses.
Charcoal.
Colored Crayons.
Erasers.
Thumb Tacks.
Rulers.
Knives.

Prices of Materials.

The prices given below are those listed in catalogues. In buying in quantities a reduction is usually made.

Drawing tables (can be made for about)	$4.00 each
Drawing tables (can be purchased at)	$5.00 to $10.00 each
Pedestals,	$1.00 each
Burlap, per yard,	15c. to 25c.
Casts:	
Panels, each,	$ .50 to $ 2.50
Masques, each,	.50 to 2.50
Busts, each,	1.00 to 10.00

Books listed elsewhere.

Still Life:

Pottery Models, ½ doz. pieces,	$4.00 to $6.00
Tea pots, bean jars, bowls, bottles, jugs, and baskets of good form and color can be purchased at the 5 and 10 cent stores.	

Drawing Boards:

Can be made by pupils.	
Can be purchased, each,	$ .75
Water color paper, per sheet, 26 in. x 40 in.,	.25
Special prices in ream lots.	
Tinted paper, 19 in. x 25 in., per quire,	$1.25
Manila paper, 9 in. x 12 in., per quire,	.40
Tracing paper, 9 in. x 12 in., per quire,	.40
Squared paper, 9 in. x 12 in., 100 sheets,	.20
Charcoal paper, 19 in x 25 in., per quire,	.75

Water colors in tubes:

Winsor & Newtons. Discount of 20% allowed.

		per tube
Reds	Alizarin Crimson,	$ .50
	Rose Madder,	1.07
	Vermillion,	.25
Yellows	Cadmium Pale,	.63
	Cadmium Deep,	.63
	Indian Yellow,	.50
Blues	New Blue,	.25
	Cobalt Blue,	.63
	Prussian Blue,	.25
Burnt Sienna,		.25
Black,		.25
Chinese White,		.25
Water color boxes (filled) (three colors and black), per box,		.25
Brushes	Large camel hair,	.30
	Small camel hair,	.10
Pencils	Soft sketching, per gross,	4.00
	Medium sketching, per gross,	4.00
	Hard sketching, per gross,	4.00
Blotters, 16 sheets, 9 in. x 12 in.,		.25
Palettes, China, 5 in. x 9 in., per dozen,		6.00
Colored crayons, per box 8 crayons,	.05 to	.15
India Ink, per dozen bottles,		3.00
Scissors, per dozen,		1.80
Compasses, per dozen,		1.80
Charcoal, per box,		.15
Erasers, per dozen,		.15
Thumb Tacks, per box of 100,		.20
Sloyd Knives,		.20
Leather Tooling Tools, each,		.40
Paste, pint jar,		.20
Rulers, per gross,		2.75

List of Firms.

F. Weber & Co.,	Philadelphia.
Eugene Dietzgen Co.,	New York.
P. P. Caproni & Bro.,	Boston.
Milton Bradley Co.,	Philadelphia.
The Prang Co.,	New York.
Atkinson Mentzer Co.,	New York.
Dixon Crucible Co.,	Philadelphia.
Eagle Pencil Co.,	New York.

Mechanical Division.

Drawing is the basis of all industrial work. Mechanical drawing gives the facts necessary for construction. A drawing giving the facts of form and dimensions is technically termed a "working drawing."

Since the work of today is largely industrial the work in Mechanical Drawing should make a strong appeal to many boys.

Certain fundamental processes underlie all industrial drawing whether architectural or mechanical. It is, therefore, advisable to spend at least two years on general work.

Such exercises as simple freehand working drawings, lettering and geometric problems should come at the beginning of the high school work.

If desired, differentiation may occur at the beginning of the third or fourth year.

At this time a division for architectural drawing and another for industrial drawing may be made.

The following course may be taken as suggestive for high school work.

First Year.

Three simple freehand working drawings made from models of articles to be constructed.

Pupils should learn to select the proper views for showing construction and the correct placing of these upon the paper.

The proper dimensioning of a drawing should be taught.

These drawings should be used in the shop during the construction of the articles. The following articles are suggested:

1. A bread board.
2. A key rack.
3. A bench hook.

Any article that is to be constructed in the shops may be substituted for the above problems.

Lettering is an important part of every drawing and it will be necessary for each pupil to make several sheets of lettering in order that he may learn a uniform system to be used throughout his work.

It is suggested that all capital letters of a slant of 60° be used.

The placing of the lettering is an important part of the arrangement of the sheet. It should not be scattered over the sheet but should be grouped perhaps in the lower right hand corner. Slant letters appear higher and therefore should be made quite low.

Letters 3-32″ to 1-8″ high are suitable for notes. The title or name of article drawn may be printed about 3-16″ to 1-4″ high and usually may be placed at the top of the sheet.

As a foundation for mechanical drawings, to follow a series of geometrical problems is necessary. The following are suggested:

To Bisect a line.
To Bisect an arc.
To Bisect an angle.
To Erect a perpendicular.

Following these problems more working drawings will be necessary in order to provide drawings from which to work in the shop. The articles will depend on what is to be made in the Manual Train-

ing shop. The character of the work will depend upon the locality in which it is done. Selections may be made from among the following or other simple articles which are to be constructed in the shops.

Swing board.	Double tree.
Sleeve board.	Chicken coop.
Ironing board.	Egg tester.
Sled board.	Foot stools.

SECOND YEAR.

Students should continue with shop exercises paying especial attention to constructive design.

The study of the difference between good and bad design in furniture is important. History of the styles of furniture may be taken up. Study furniture in its relation to the home. Furniture suited to different rooms in the home.

Suggestive Problems.

Chairs.	Tables.
Taborets.	Bed-steads.
Stands.	Stools.

The Mechanical Division may be separated into two distinct courses at the beginning of the third year, namely: The Architectural course and the Boys Industrial Course.

Architectural Course.

The Architectural course is planned for those who wish to prepare to enter schools of Architecture. Boys who wish to enter college with a general knowledge of drawing will doubtless elect this course.

In this course an appeal to the aesthetic should be made.

Teach principles of parallel and angular perspective by free-hand drawing of books and boxes in different positions. Convert the drawing of a box into that of a simple house adding roof, doors, windows.

The following problems in *freehand perspective* are suggested

Draw a box in parallel perspective.

Draw a box in angular perspective.

Place a triangular prism upon a rectangular prism and use the groups for teaching points in oblique perspective. Show how to represent a house in perspective, keeping the vanishing points on the paper. Make a larger drawing of a house having the vanishing points outside the paper.

Mechanical Perspective.

Draw a cube or square prism in parallel perspective.

Draw a square prism turned at an angle of 45° with the picture plane.

Represent in mechanical perspective a simple house turned at an angle of 30° and 60° to the picture plane. Use the roof plan and elevations.

Represent in mechanical perspective a flight of four steps turning at an angle of 30° and 60° to the picture plane.

Problems in projection of shadows may be given here.

FOURTH YEAR.

Students make floor plans of their houses drawing to a scale.

Make a study of houses, cottages and bungalos. Students should be encouraged to study magazines and study good plans.

They should then make plans and elevations for an original house or cottage. Drawings should be made in the following order, using the same scale for all.

Floor plan.
Roof plan.
Front elevation.
Side elevation.

Using these plans and elevations for measurements, make a mechanical perspective drawing of the original house.

The remainder of the time may be spent either in the study of interiors or a further study of buildings.

Boys Industrial Course.

The Boys Industrial Course is planned for boys who expect to become engineers or draftsmen.

The work of this course should be of such a character as to teach the application of projection to the drawing of machinery, principles of machine construction and design and commercial drafting-room practice. In order to do this the course must contain machine lettering and conventions, sketching, designing with the use of tables, mechanism, drafting room practice, machine details and assembly.

Machine Lettering and Conventions.

Classify simple, complex and compound machines. Study different methods of power transmission; manner in which speed may be varied, overhead, floor and underfloor hangers, size of shafting and pulleys; methods of fastening pulleys and gears on shafting; bearings.

Suggestive Problems:

Lathe,
Pump,
Steam engine,
Power saw.

Sketching.

Sketching of machine parts and lettering.

Classes of drawing.
Assembly,
Details,
Motor Diagrams,
Erection.

First lay-out for sketch; determine the necessary views. Consider the methods of representing by freehand perspective, mechanical perspective, cabinet perspective and isometric drawing.

Suggestive Problems:

Monkey wrench,
Globe valve,
Lathe parts,
Engine parts.

Designing.

With the use of the formulas and motion diagrams, found in Mechanic's Hand-book, design a piece of machinery to perform some work already determined upon.

Suggestive Problems:

Levers, belts, gears,
Simple machine,
Motion diagrams,
Cams.

Detailing.

Explain the necessity for detail sheet. Secure detail drawing sheets from manufacturing concerns and make a study of them. Determine upon the arrangement of the sheet. Explain the use of notes and necessity for good drawing technique.

Suggestive Problems:

Use sketches made in previous exercise.

Checking.

Explain the necessity for checking, the methods of checking and of making corrections on drawings.

Assembly.

Explain the use of assembly drawing. Relation which it bears to detail drawings, Assembly sections, conventions, etc.

Suggestive Problems:

Assembly of parts that were detailed in previous drafting room practice.

Explain the use of tracing cloth and blue prints and methods of making blue prints in the drafting room. Explain drafting room practice.

Mechanical Drawing.

Anthony, ...Machine Drawing, D. C. Heath & Co.
Anthony, ...Mechanical Drawing, D. C. Heath & Co.
J. C. Tracy, ...Mechanical Drawing, American Book Co.
C. H. Edminster, ..Mechanical Drawing, American Book Co.
Chas. A. Bennett, ..Problems in Mechanical Drawing.
Mathewson, ...Notes in Mechanical Drawing.
Mathewson, ...Applied Mechanical Drawing.
Mathewson, ...Perspective Sketching from Working Drawings.
Littlefield, ...Notes for Forge Shop Practice.

THE OUTLINES IN COMMERCIAL SUBJECTS ARE TAKEN FROM THE PROCEEDINGS OF THE NORTH CENTRAL ASSOCIATION OF COLLEGES AND SECONDARY SCHOOLS.

Business Arithmetic ($\frac{1}{2}$ unit).

The object is first of all absolute accuracy, and secondly speed, in ordinary business computations. To secure these essentials, not less than half of each recitation should be devoted to mental drill on simple exercises. For the same reason, no credit whatever should be allowed on work involving any error in computation and a rigid time limit should be set for all written work.

As to subject matter, complicated methods and obsolete subjects should be eliminated. The topics to be emphasized are: (1) the fundamental operations with integers; (2) common fractions having as denominators 2, 3, 4, 6, 8, 12, or 16, and small decimals; (3) a few common weights and measures, but not the mass of uncommon ones, nor a mixture of denominations (e. g. no merchant sells cloth by yards, feet and inches, but by yards and fractions thereof); (4) percentage and its more important applications, especially interest and discount; (5) short methods, especially thorough drill in the use of interest and other calculation tables.

Text book, supplemented by numerous live exercises from current sources, such as stores, trade papers, etc. The methods should be planned so as to arouse and sustain interest. "The class work must touch life and breathe the spirit of business."

Elementary Bookkeeping (1 unit).

The technical business subjects, especially bookkeeping and stenography, are vocational in purpose and must therefore be taught with a view to practical mastery. This fact should suggest and control the method. For example, no credit whatever should be allowed unless the work is done neatly, accurately, and at a satisfactory rate of speed. And there should be a combination of class and individual methods of instruction to secure maximum results. In order to establish sound habits, it is also well to provide double periods for elementary bookkeeping, and require all work to be done in the class room under the eye of the instructor.

The first requisite is a good, clear business handwriting. Unless pupils have it, which they rarely do, they should be required to do a prescribed amount of practice writing under the supervision of the instructor.

Definitions of double entry terms, with rules for debit and credit, kinds and uses of books. Conduct of a set including the journal, cash book, sales book ledger, check book, bank pass book and trial balance book; closing of books. Single entry set; changing from single to double entry.

Text book, with exercises so arranged that no two pupils will do exactly the same work.

Advanced Bookkeeping and Business Usage (1 unit).

Thorough drill on the preparation and interpretation of standard business forms, such as bills, receipts, checks, notes, time and sight drafts, acceptances, endorsements, invoices, accounts sales, deposit tickets, warehouse receipts, express receipts, bills of lading, statements of account, balance sheets, etc.

Explanation of business symbols and abbreviations.

Bill book, invoice book, special books, loose leaf and voucher systems of bookkeeping.

Each student is to carry on a business of his own, manufacturing, banking, wholesale, retail, jobbing or commission; at first as an individual, then as a partnership, finally as a corporation, thus involving the use of several forms of accounts.

Credit on this course should mean that the school is ready to vouch for the student as one thoroughly versed in the principles and practice of bookkeeping, who lacks only actual business experience to become a competent bookkeeper.

Business Law (½ unit).

The object of this study is not to make "every man his own lawyer," but rather to enable him to keep out of legal complications. Ignorance of the law excuses no one.

To this end, it is necessary to study the legal principles governing business relations, especially contracts, their nature, essentials, and effects; further sales, interest and usury, bills and notes, agency, partnership, corporations, real property and mortgages, liens, attachments, surety and guarantyship, bailments, common carrier, banking, fire insurance, landlord and tenant.

Text book, supplemented by some study of cases (by way of illustration), discussions, and practice in drawing legal papers such as a contract, note, bill of exchange, bill of sale, bill of lading, power of attorney, deed, mortgage, lease, notice of protest, etc.

Stenography and Typewriting (2 units).

This work is expected to occupy not less than two periods daily for two years. No credit should be given for either shorthand or typewriting if taken alone.

The "touch" method is strongly recommended in typewriting.

The object is first, accuracy, and second, speed in taking dictation and transcribing notes. Equally essential are correct spelling, capitalization, punctuation and paragraphing.

No credit should be given unless the following speed is attained; at the end of first year, 75 words per minute in dictation and 25 words per minute on the machine; at end of second year, 500 words in 5 minutes dictation, and 35 words per minute in the transcription of notes.

Thorough training should also be given in care of the machine, and in methods of copying, manifolding and filing papers.

Business Spelling and Correspondence (½ unit).

Preliminary review of 500 common business words. Thorough drill on business correspondence including:

(1) Form of business letter, beginning and endings, etc.
(2) Choice of words and structure of sentences with reference to clearness and brevity.
(3) Capitalization, punctuation and paragraphing.
(4) Writing and answering telegrams and advertisements.

If the pupil does not write a clear and neat business hand, he should be required to make good his deficiency, or no credit should be granted for the course.

Text book, supplemented by letters relating to the most prominent industries of the locality.

Commercial Geography (½ unit.)

As the history of commerce is concerned with the past of commerce, so commercial geography describes and seeks to explain the geographic distribution of industries and the resulting course of commerce to-day. It is "a comparative study of the nations of the world, their commercial prominence and their contest for the trade of the world."

The introductory work should cover: (1) the effect of surface, soil, climate, etc., that is, the physical factor in commerce; (2) the influence of race, religion, education, commercial policies, etc., that is, the human factor in commerce; (3) the effect of economic forces on production and commerce; (4) means of transportation and communication.

Following this should come a detailed study of the United States by sections and then as a whole, with reference to physical features and climate, natural resources, population, leading industries, transportation facilities and commerce, especially foreign commerce; then a study of the outlying possessions of the United States; and finally a survey of the other important commercial countries from the same viewpoint.

Text book, supplemented by map work and assigned readings. For purposes of illustration, samples of commercial staples, lantern slides, stereopticon pictures, etc., should be freely employed; and whenever possible, visits of inspection should be made and informal lectures secured by experts in various districts. Should be preceded by physical geography in case both physical and commercial geography are taken.

Elementary Economics (½ unit).

The study of Economics is indispensable if the business man is to understand the process in which he has a part, and the tendencies which are at work in the business world of to-day.

In the high school, it is necessary to avoid two extremes: the one, abstract theory; the other, controversial questions. While not omitting theory, emphasis should therefore be placed on historical and descriptive matter.

Text book, with collateral readings, especially on the economic history of England and the United States. In the selection of texts it is well to avoid large and difficult books intended for college classes.

DOMESTIC SCIENCE.

COOKING.

Schools with adequate equipment may carry out the entire course in cooking as outlined below. Schools which do not have sufficient equipment to complete the course may select such topics as they are able to give. The selection of these topics should be governed by the needs of the home.

The study of food and the cooking of it should be an important part of the domestic science course. Skill in the preparation of food without a knowledge of how to buy and select the proper food is not of much benefit to the individual. The preparation of a cheaper cut of meat so that it is not only tasty but nutritious should be emphasized rather than the preparation of dainty salads, candies and desserts. Undoubtedly some work should be given in simple desserts, as they afford an attractive way to furnish some other required food principles. However, a course in which the emphasis is placed upon the preparation of dainty dishes would not be a desirous one from the standpoint of the actual needs of the home.

In connection with the preparation of foods some time should be given to the study and discussion of food values so that the pupils will understand what constitutes a well balanced meal, as to cost, variety and quality.

Frequently there will be courses in natural science which parallel the work in cooking. In such instances a very valuable correlation may be worked out between the cooking and the science whereby many experiments may be performed which will be helpful to the students.

This course has been planned to cover one year of school work. The time allotted to this work should not be less than 108 hours—3 hours a week for 36 weeks. One-half unit of credit to be given for this work. 180 hours—5 hours a week for 36 weeks would be much more desirable. At least one hour a week of the time devoted to cooking should be devoted to lecture and recitation. During this lecture and recitation period preparation for the laboratory should be made. The laboratory periods should be not less than two periods in length. Effective work cannot be done in a shorter time.

Owing to the lack of suitable texts many of the directions will have to be given by the teacher to the pupils, who should keep them in note books. The girls should be taught not to follow the directions by rote, but they should be trained to act and think independently.

This course has been arranged by topics and no attempt has been made to divide each topic into separate lessons. This has been left to the discretion of the teacher. Nor it is necessary that the topics be taught in the order in which they are presented in this course.

The teacher should aim to present the topics at a time when the material for the same can be secured to the best advantage. For instance, it would not be desirable to present a lesson in eggs in midwinter when the price of eggs, if fresh eggs can be purchased at all, is exorbitant. Nor would it be advisable to present a lesson in fruits at any other time except when they are in season. In other words the aim of the teacher should be to present the various topics at a time when the food stuffs are in season and can be purchased economically.

Each teacher should study the needs of the community before she gives to her class directions for preparing food. There are few communities in which conditions are the same. The customs and foods differ. All work in cooking should be so planned as to be of use in the average home.

References.

No one volume is recommended for the cooking teacher. Much valuable information may be received from the bulletins published by the School of Agriculture and the Experiment Station, State College, Pa. Each class should be supplied with several standard texts on cookery. The Farmers Bulletins on nutrition issued by the Department of Agriculture, Washington, D. C., may be easily obtained.

Contents of Course.

Kitchen. Size; cost; equipment; arrangement; lighting; ventilation; care of the kitchen.

Sanitation. Reasons for cleanliness; natural and artificial aids to cleanliness; care of sink and refrigerator; scrubbing; sweeping; dusting; care of dishes. While special instruction may be given in sanitation at this stage of the course this work should be given attention throughout the entire course.

Fuels and Cooking Apparatus. Construction; care and operation of stoves; various kinds of fuels; cost and convenience; advantages and disadvantages of each.

Food Principles. The following elements are required by the body.

Carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, iron, calcium, magnesium, sodium, potassium, iodine (traces), fluorine (traces).

The proteins furnish carbon, hydrogen, oxygen, nitrogen, sulphur and sometimes phosphorus.

Fats furnish carbon, hydrogen and oxygen.

Carbohydrates furnish carbon, hydrogen and oxygen.

Water furnishes hydrogen and oxygen, and some mineral matter.

Mineral matter furnishes phosphorus, iron, calcium, magnesium, sodium, potassium, iodine and fluorine.

These food principles build tissue, give heat, make energy and regulate processes of the body.

Protein's supply energy.

Fats supply energy in the most concentrated form while carbohydrates supply it in the most economical form.

Water supplies building material (about 60% of body being water) and helps to regulate body processes.

Mineral matter supplies building material, except nitrogen and sulphur, and helps to regulate body functions.

Examples of foodstuffs rich in each food principle: Proteins—eggs milk; cheese; lean meats; fish. Fats—cream; butter; meat fats; vegetable oils; nuts; yolk of eggs. Carbohydrates—Cereals and cereal products; potatoes and other starchy vegetables; chestnuts; sweet fruits; sugar. Mineral matter—milk; green vegetables; fruits; whole wheat and other whole cereal products; egg yolk. Water—fresh fruits; fresh vegetables; milk; beverages, including water as such.

Principal Methods of Cooking.

Direct application of heat:

Broiling: Cooking over a glowing fire.

Roasting: Cooking before a glowing fire.

Application by means of heated air.

Baking: Cooking in an oven.

Heat applied by means of water.

Boiling: Cooking in boiling water.

Stewing: Cooking for a long time in water below the boiling point. By contact with steam.

Steaming: Moist; cooking in steamer.

By heat of steam surrounding vessel.

Steaming: Dry; cooking in double boiler.

Heat applied by means of heated fat.

Frying: Cooking in hot fat deep enough to cover the article to be cooked.

Sautering: Cooking in a small quantity of hot fat.

Heat applied by means of heated metal.

Pan-broiling: Cooking in a frying-pan; or

Pan-baking: On a griddle with little or no fat.

Braising: A Combination of stewing and baking.

Fricasseeing: A combination of frying and stewing.

Water.

Recitation. Characteristic of sage water; characteristic of pure water; hard and soft water; methods of purifying water; uses of water in the body and in cooking.

Practical work: Making beverages, such as tea, coffee, cocoa or lemonade.

Fruits.

Recitation: Uses of various kinds of fruits; composition and value as food; methods of preparing fresh food; decay of fruits; cause and prevention of decay; methods of preserving fruits and vegetables; sorting; cleaning; storing; drying; sterilizing; the use of sugar, spices and vinegar in preserving fruits; harmful preservatives.

Practical Work: Serving fresh fruits: Stew, bake and steam fruits; cook dried fruits; use canned fruits; can fruits; make jam and jelly.

Vegetables.

Recitation: Composition; kinds; uses; food value.

Practical Work: Preparation of different kinds of vegetables; selection of vegetables; different methods of preparation of vegetables; boiling; steming; stewing; creaming; baking; scalloping; sautering; vegetable soups.

Milk.

Recitation: Analysis; care, composition and digestion of milk; food value of milk; preparation of milk for invalids and infants; effect of pasteurizing and sterilizing on nutritive value and flavor.

Practical Work: Separate milk into its parts; make butter, cottage cheese, junket; pasteurize milk; make milk dishes; investigate home milk supply.

Eggs.

Recitation: Composition; food value; preservation of eggs; causes of decay; testing; cost at different seasons; use of eggs.

Practical Work: Preserve eggs for winter use; test for freshness; cook eggs in various ways; cost of egg dishes at different seasons.

Cheese.

Recitation: Composition; food value; kinds and manufacture of same; methods of cooking.

Practical Work: Make cheese dishes; make cottage cheese; use cheese with macaroni.

Cereals.

Recitation: Food value; composition; selection; method of preparation.

Practical Work: Cook cereals; serve in various ways; use left-over cereals.

Meats.

Recitation: Structure; composition and nutritive value; selection of meat, tender and tough cuts; reasons and methods of cooking; use of left-overs; preservation of meat; cost of meat.

Practical Work: Study structure of meat; buy meat at market; prepare tough cuts; prepare meat stock; make and cook hamburger steak; make meat balls; prepare pot roasts, stew or friccassee; cook pork, veal, mutton and poultry; roast meats; use left-over meats as hash, meat-pies, stews, sandwiches; cook bacon, corn beef, ham, etc.; make meat dishes using tough cuts.

Legumes

Recitation: Composition; food value; substitutes for meat.

Practical Work: Baked beans; dried pea soup.

Fats and Oils.

Recitation: Composition; food values; use in the body; kinds and source; dangers attendant to use; use of fat for frying; effect upon digestion; cost of fats; substitutes for butter in cooking.

Practical Work: Render fat; classify fat; fry cooked and uncooked foods using different fats. Make soup from old fat.

Gelatin.

Recitation: Source; commercial preparation; composition and value as a food; function in the body.

Practical Work: Make gelatin preparations using commercial gelatin.

Fish.

Recitation: Composition and value of food; methods of preserving; methods of cooking; reasons for cooking; varieties; cost; selection.

Practical Work: Cooking fish; salt and dried fish; use left-overs in fish balls and croquettes; cook oysters.

Bread.

Recitation: Methods and materials used in making bread; kind of yeast used; amount of flour; kneading; time and temperature needed for baking bread and changes produced by this process; serving of bread; nutritive value and cost of bread.

Practical Work: Bake plain, whole wheat, rye and graham bread; bake rolls; make toast, sandwiches; compute cost of bread made.

Batters and Doughs.

Recitation: Composition; kinds and classes of flour; food value of flour; leavening agents—air, steam, soda, baking powder and yeast.

Practical Work: Make sponge cake, pop-overs, griddle cakes, muffins, cakes, biscuits and pastry.

Salads.

Recitation: Values as a food; appetizer; as a means of furnishing a variety and mineral matter; preparation; suitable combinations.

Practical Work: Select materials for salad; prepare salads; prepare salad dressings; compute cost of salad.

Sugar.

Recitation: Source, kinds; composition; manufacture of sugar; properties; value as a food; adulteration.

Practical Work: Make syrups for preserving; make frostings.

Beverages.

Recitation: Tea, coffee; cocoa; chocolate; composition of each; their food value; methods of preparation; fruit drinks.

Practical Work: Make tea, coffee, chocolate, cocoa and fruit drinks.

Meals.

Recitation: Planning meals so as to reduce cost; secure variety; planning meals for the various seasons and for the sick; planning lunches.

Practical work: Serve meals; prepare school luncheons; prepare breakfast, dinner and lunch; prepare lunches suitable for workmen.

Sewing.

The course in sewing is planned for the Borough, Township and small City High Schools, and not especially for Technical High Schools. It consists of a general course in garment making, complete in itself, and some work in millinery. This course is arranged to cover at least three periods, preferably five periods, a week for 36 weeks. Credit for one-half unit to be given for the sewing. One of these periods should be used for lecture and quiz work. The remaining two or four periods should be devoted to practical work. Not less than two periods should be taken at one time for this work.

A discussion of the work and related subjects should be held at the quiz period. By so doing the girls may be given helpful suggestions for overcoming the difficulties that confront them in the practical work. The pupils should bring some materials from home and test them under the direction of the teacher as to durability and kind of material. Frequent visits to woolen and cotton mills are very valuable aids in this work.

The teacher should familiarize herself with the local conditions and adapt her teaching to the community and to the needs of the individuals. The type of sewing work suited to a small mining com-

munity would not be suitable to a well-to-do suburban community. In the first case a teacher should lay special emphasis on the renovating of old clothing and the purchase of inexpensive but good materials. The teacher should not plan everything for the pupils but rather encourage them to plan and think for themselves so that they may develop independence. The pupils should not be permitted to sew without due regard to the time element. They should be required to finish their pieces in a reasonable length of time.

Care should be taken in all sewing work to prevent the children from indulging in showy styles. They should be encouraged to make all garments along simple and refined lines. Much of the material may be brought from home and care taken to limit the expense of the article to the means of the individual.

Note books should be kept by the students in which all directions given by the teacher should be entered. Note books should be inspected from time to time to see that they are being kept in proper form.

Frequently pattern drafting is included in High School sewing courses. The benefit of such work is very much in doubt. It would be much better not to rely so much on drafting to make a new pattern but rather take any pattern available and adapt it to the purpose for which it is needed. Whatever drafting is given should be given with this in view.

The articles in this course are suggestive only. Undoubtedly, the needs of the pupils may be such that some other piece of clothing should be made. This is left to the discretion of the teacher. However every piece that is made in the sewing room should be of some practical use, not a plaything.

Much help for the teacher and the sewing class may be secured from advertisement sheets of laces, cloths and embroideries, also samples and cost of the various things advertised. Each sewing room should have several of the home magazines in it. Photographs of the models of the various styles in clothing are also a great help.

If the girls have had no previous instruction in sewing, the elementary stitches used in garment making must be learned as needed. Girls in the high school should not be required to sew by hand any longer than necessary. The work should not be all sewing. The cutting, measuring, hand work, machine work and other operations in garment making should be alternated so as to give each pupil a variety of work and experience. Perfect stitches should not be expected. However, enough practice to insure usable work should be required. Whatever knowledge the individual has acquired should be applied in the making of some simple usable articles, such as bags, aprons, pincushions. While making such articles much prac-

tice in the several stitches may be secured. Many useful articles can be made by combining hand and machine sewing before actual garment construction is started.

Hand Sewing: The necessary stitches only should be taught. The running, gathering, hemming, overhanding, overcasting, slip stitching and button holing are sufficient for most garments. The French and fell seam, plackets on drawers, shirt or skirt waist sleeves and the sewing on of a band are difficult for the girl and some practice will be needed. The cross stitch, herring-bone stitch, feather stitch and hemstitching may be used for decorative purposes.

Machine Sewing. The care and operation of the machine should be taught. Most girls will need individual practice in straight and curved sewing, and in the use of the various machine attachments. As little practice on models or pieces of material should be done as possible. Most pupils will learn more rapidly and develop skill faster when they work upon something that can be used.

Garment Making. Machine and hand sewing should be combined in the making of undergarments and other wearing apparel. Whatever articles are made by the pupil should have a utilitarian value commensurate with the time required to make it. Care should be exercised that the article attempted is not beyond the ability of the pupil. Simplicity and the need of the student should be the keynote to all the sewing work.

Each girl should plan her garment, select the material and determine the cost. She may draft the pattern or purchase one at the store. Several pupils should not use the same design. Altering and adopting standard patterns and fitting should be taught.

Wherever decoration is used it should not be elaborate or gaudy. It should always be in keeping with the design of the garment upon which it is used. Such stitches as the herringbone, cross, chain and feather may be used to an advantage for decorative purposes.

Repair Work. Darning, patching and making over garments should be taught. The articles for this work should be brought from the home. All pieces used for repair work should be in need of this work.

Millinery. Enough millinery work should be given to enable the average girl to make over her hat, trim a frame such as may be purchased at a department store. Particular attention should be given to the selection of a style of a hat and the color of the trimming so as to suit the individual.

The process of washing and ironing should be taught so as to enable the students to launder their wash clothing. Several lessons in renovating goods and preserving clothing should be given. This work is very valuable from the economic standpoint and is an essential element in personal appearance.

Suggestive Work.

Articles for use in kitchen and about the home; aprons; caps; towels; hemmed; hemming napkins and table cloths; garments; drawers; chemise; underwaists; nightgowns; muslin petticoats and underskirts; shirt waists of cotton material.

Darning, Patching and Making Over. Darning underwear, stockings, sweaters, shirts; patching holes in clothing; shortening or lengthening skirts and sleeves; altering sleeves, waists or skirts.

Millinery. Bowmaking; wiring and lining straw hats; making milliner's folds and placing on hat; renovating lace, velvet and silk; making a simple hat, frame having been purchased.

Laundering. Wash and iron the articles which have been made in the sewing class, clean clothing and press.

Suggestive Work for Recitation.

Clothing. The uses of the various stitches; names and parts of a garment; the best material to purchase for different uses; the designing and care of clothing; effect of sun and washing on colored materials; cost of clothing related to income; seasonable clothing; the relation of clothing to health; study of good and bad designs for clothing; study of various cloths; manufacture, uses and cost.

Economics. The division of the income; sweatshop work; purchasing clothing.

Arithmetic. Computing cost and amount of material required for a garment; problem involving fractions when computing amount of material needed to cut bias bands; making out of bills and receipts for material.

MANUAL TRAINING.

The function or purpose of manual training in the school is to give the boy a variety of experiences in the handling of tools and to teach him the processes by which certain forms of work are completed, so that he may make an intelligent selection of his life's work. It is not the purpose of manual training to train for any one particular occupation, it is a part of general education. All boys no matter what their future vocation will be should have some knowledge and skill in the use of tools and mechanical operations. This knowledge will be a valuable aid in securing independent thought and action upon the part of the individual.

Whatever mechanical processes are used in the manual training shop, they should be in keeping with the best industrial practices of the day. Much may be learned as to the practical way of doing things by observing the average mechanic at work. Study the various operations which he uses, and adopt such ones as give good results in a reasonable length of time.

Each teacher should be familiar with the amount of time necessary to construct a given article and should insist that the pupils make this article in this given length of time with a reasonable degree of accuracy. In too many courses the time element is neglected. Pupils are allowed to take an unreasonable length of time to make an article. This tends to decrease their efficiency rather than increase it, and is a handicap to them if they wish to enter a commercial establishment or a vocational school. No work is worth doing if it cannot be done in a fair length of time.

All problems which are constructed in the manual training shop should have a commercial value. Probably not in the sense that the article be sold upon the open market but that it is needed in the school or in the home. Frequent visits to industrial shops will be of invaluable aid to the manual training work. It will give to the students an idea of commercial and industrial processes and the requirements of the various industries upon the workers. In other words it will give industrial information which when correlated with the shop work will enable manual training to fulfil its real function —that of assisting the boy to find himself.

WOODWORKING.

This course in woodworking has been arranged so as to show the operations and tools involved in the construction of a number of problems. A few problems are suggested. It is not intended that all of these articles should be constructed in the manual training shop. The selection of any particular problem should depend entirely upon the fact that it fulfills some need of the home, the school or the pupil. The teacher should encourage the boys to select and plan their own problems. In addition to the wood work, instruction should be given in the making of repairs about the school and home, as a large number will put their experience into practice by doing such work.

This course is intended to occupy a period of at least 108 hours each year—three hours a week for 36 weeks to count as one-half unit. However, 180 hours, five hours a week for 36 weeks a year is to be pre-

ferred. The entire course is not to be less than two years in duration. If the minimum length of time be allowed for manual training it may be necessary to curtail some of the work planned. To do effective work it is necessary that the shop period be not less than two periods in length.

The first year of the course is intended for pupils who have had no previous instruction in the use of tools.

In the construction of an article in wood, there are at least five fundamental operations which should be performed. Besides these five processes, additional ones must be completed from time to time as more advanced problems are undertaken by the pupil. The most important of these processes are given below. It is not intended that the following order be adhered to in the school shops.

1. Working Drawing or Plan. A working drawing of the object to be built either should be made by the pupil or supplied to him before he attempts the work of construction.

If the drawing be made in the shop, a pencil, compass and rule are all that are necessary.

2. Bill of Material. When the plan has been provided, a bill of material should be made out so that the pupil may know the kind, quantity and cost of material. This may be written on a sheet provided for the purpose or upon ordinary paper.

3. Laying Out. The various parts of the article to be constructed should be laid out upon the rough stock so as to cut the lumber to the best advantage. All pieces should be cut larger than the finished piece so as to allow for planing to dimensions. The tools required for this step are a framing square, try square, rule, gage, pencil, scratch awl and knife.

4. Cutting stock. The tools used are the cross-cut saw and rip saw.

5. Free Planing The use and care of block and jack planes; planing with the jack plane so as to secure smooth surfaces; planing ends of sticks using the block plane.

6. Accurate Planing. Planing true surfaces; planing to length, width and thickness with the smoothing and fore planes; jointing with the jointer.

7. Modeling. Making curved surfaces by using the turning saw and spokeshave.

8. Chiseling. Chiseling with and across the grain; champering; paring tenons; cutting mortises.

9. Boring. Use and care of the auger bits, expansion bits, drill points, gimlets and awls; boring with and across the grain, through and to a certain depth with an auger bit.

10. Joinery. Use of the mitre, lap, mortise and tenon and butt joint. Method of laying out joints.

11. Laying out duplicate parts. Methods of laying out duplicate parts as found in the taboret; using the try square, rule and knife.

12. Cutting out duplicate parts. Cut out the duplicate parts layed out in previous operations.

13. Gluing. Various kinds of glue, methods of preparation, gluing up various kinds of joints; gluing up a table joint.

14. Paneling. Use of the panel plow, router plate and universal plane.

15. Construction. Assembling parts for problems and fastening together with screws, nails and glue; putting on hinges, handles, etc.

16. Finishing. Scraping and sanding wood so as to secure a very smooth surface; staining and waxing; filling and varnishing or shellacing; polishing with pumice; rubbing with steel wool.

17. Design. The design of a piece of furniture or a cabinet. All problems which a pupil attempts should be planed so as to start with the simple operations. Each succeeding problem should involve a greater number and more difficult processes. Below is a course illustrative of the manner in which the various processes given above may be combined. Also a number of problems are suggested. *Do not use any model given in this course if it should not meet the conditions under which the boy is working.*

First Year.

1. Bench-hook, nail boxes, tool box and bird houses.
2. Drawing board, taboret top.
3. Picture frame.
4. Taboret, using mortise and tenon joint.
5. Book shelves.
6. Simple chair.

Suggestive Problems.—Sled, stool, wastepaper box, flower stand, bread board, sleeve board, swingle tree, wagon jack, taboret, plate rack, umbrella rack, book shelves, peck crate, bird house, stirring paddle, milk stool, hatchet handle, egg tester, snow plow, dog kennel.

Second Year.

Furniture and Cabinet Making.

1. Review of fundamental processes. Stool.

2. Design and construct some piece of simple furniture; make working sketches and then the complete mechanical drawing from the sketches. Magazine rack.

3. Design and construct a more difficult piece of furniture, working in the mortise and tenon joint. Table.

4. Design and construct a piece of furniture involving panel and drawer construction. Wall cabinet, music cabinet.

5. Finish the various projects constructed and refinish some old piece of furniture.

6. Upholstering. Upholster some piece of new or old furniture.

Suggestive Problems.—Screens, bookcases, tables, chairs, settees, tool chests, music cabinet, repair furniture.

Suggestions for the Teaching of Furniture and Cabinet Making.

Make a collection of furniture catalogues. These catalogues will then furnish the material for a study of design. The pupils should criticise the various designs of furniture so as to distinguish between good and bad design. Inspection trips should be made to furniture factories so that the pupils may become familiar with the various methods used in the construction of furniture on the commercial basis. If furniture is needed in the schools make it in the shop. When a number of pieces of the same design and dimensions are to be made, organize the shop work so that one group will make one part, another group make a second part and the third group do the assembling, placing in charge of each group a boy as foreman. Give instruction in the use, care, operation and dangers of machinery. Do as much work with the machines as possible. Give talks on cabinet and furniture construction and finishing.

Each teacher in manual training should correlate the manual training work with other subjects. This correlation should be worked out with all the problems attempted in the shop. Below is given an example to illustrate the manner in which the manual training and other subjects may be correlated. For instance, the bench-hook is related to drawing because it is essential either to make or to have a working drawing made before it can be constructed. It may be correlated with botany by making a study of the characteristics of the wood from which it is constructed. It may be correlated with industrial life by making a study of logging, sawing, seasoning and shipping and with the manufacture of nails and screws. The foregoing is but one example of the numerous ways by which correlation between manual training work and other subjects may be worked out.

REFERENCE LIBRARY FOR SMALL HIGH SCHOOLS.

The following books have been selected after much observation and inquiry. The lists include reference works on both general and special topics. They are by no means exhaustive, but, we

hope, will be helpful to teachers and boards of directors in making desirable purchases. It is understood, also, that several up-to-date texts in each subject taught are accessible to pupils. Those with the stars should be selected first and the others added as the funds allow. The prices of the books have been quoted by The Baker and Taylor Co., 33-37 East Seventeenth St., New York City, from whom any number may be selected and purchased at the prices quoted.

General works of reference.

*New International Encyclopedia, $10.85. Dodd, Mead & Co., N. Y
*Webster. International Dictionary, $9.25.
*Bliss. Encyclopedia of Social Reforms, $5.63.
*Deems. Holydays and Holidays, $3.33.
*Walsh. Curiosities of Popular Customs, $2.10.
*Crabb. Synonyms, 75 cents.
*Lippincott. Dictionary of Biography and Mythology, $7.20.
*Champlin. Young Folks' Cyclopedia of Persons and Places, $2.00.
*Champlin. Common Things, $2.00.
*Rogent. Thesaurus, 90 cents.
March. Thesaurus.
*French. The Study of Words, 88 cents.
*Rand and McNally. Atlas (Imperial), $1.00.
*World Almanac, 40 cents.
*Fry. Soubriquet and Nickname, $1.34.

Literature.

*Granger. Index to Poetry and Recitation, $5.00.
*Brewer. Reader's Hand Book, $1.20.
*Brewer. Dictionary of Phrase and Fable, 90 cents.
*Wheeler. Who Wrote It? $1.20.
*Wheeler. Who's Who in America, $3.00.
*Bartlett. Familiar Quotations, $1.80.
*Matson. References for Literary Workers, $1.34.
*Ringwalt. Briefs on Public Questions, 90 cents.
*Brookings. Briefs for Debate, 88 cents.
*Abbott. Shakespearean Grammar, $1.31.
Stedman and Hutchingson. Library of American Literature (11 vols.), $25.00.

History and Civil Government.

*Green. Short History of the English People, $1.05.
*Committee of Seven. Study of History in Schools, 44 cents.
*Fiske. Critical Period in American History, $1.33.
*Channing and Hart. Guide to American History, $1.75.
*Bulfinch. Age of Fable, 30 cents.
*Bulfinch. Age of Chivalry, 30 cents.

*Larned. History for Ready Reference, $25.00.
*Harper. Encyclopedia of American History, $25.00.
*Bullock. Introduction to the Study of Economics, $1.12.
*Cheyney. Industrial and Social History of England, $1.23.
*Bogart. Economic History of the United States, $1.57.
Goodnow. Politics and Administration, $1.13.
Johnston. Government in State and Nation, $1.40.
*Kiepert. Maps for Ancient History, $1.40.

Science and Art.

*Ames and Bliss. Experiments in Physics, $1.58.
*Smith and Hall. Teaching of Chemistry and Physics, $1.25.
*Hertwig. General Principles of Zoology, $1.53.
*MacDougal. Elementary Plant Physiology, $1.00.
*Bailey. Principles of Agriculture, $1.10.
*Wellbourn. Elements of Agriculture (South and West), 66 cents.
*Gifford. Practical Forestry, 90 cents.
*Pinchot. Primer of Forestry (Pt. 2), 30 cents.
*French. Animal Activities, $1.00.
*Ward. Diseases of Plants, $1.40.
*Dana. Minerals and How to Study Them, $1.13.
*Chapman. Hand Book of Birds of Eastern North America, $1.90.
Mill International Geography, $2.33.

Chamberlain and Salisbury. Geology (3 vols.), $10.50.
*Hamlin. History of Architecture, $1.34.
Statham. Architecture for General Readers, $3.00.
*Van Dyke. History of Painting, $1.00.
*Marquand. History of Sculpture, $1.00.

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